Cameco

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September 8, 2010

VIA COURIER

Ms. Sarah Eaton
Project Officer, Beaverlodge Project
Canadian Nuclear Safety Commission
Uranium Mines & Mills Division
Suite 520, 101 – 22nd Street East
Saskatoon, SK S7K 0E1

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Saskatchewan Ministry of Environment
Shield EcoRegion
P.O. Box 3003
Prince Albert, SK S6V 6G1

Dir Tel 306-956-6784
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Dear Ms. Eaton and Mr. Kristoff:

File no. BVL.42205.01 / BVL.42305.01

Beaverlodge Project: Year 24 Transition Phase Monitoring Annual Report (2008)

The Beaverlodge Year 24 Transition Phase Monitoring Annual Report is submitted to the Canadian Nuclear Safety Commission (CNSC) (two copies) in compliance with the WFOL-W5-2120.0/2012 signed November 30, 2009 and to the Saskatchewan Ministry of Environment (one copy) in compliance with the Beaverlodge Surface Lease Agreement dated December 24, 2006.

In the 2008 annual report Cameco provided data based on a calendar year (January 2008 to December 2008). In November 2009 the CNSC granted Cameco a licence expiring on November 30, 2012. In that licence the CNSC Commission requested that Cameco and the CNSC staff provide an annual update of activities during the fourth quarter of each year. To facilitate the preparation of the documentation required for this update meeting it was decided this Annual Report would include information on environmental conditions, site activities and project status for an 18 month period (from January 1, 2009 through June 30, 2010). This report also provides information regarding proposed projects, activities and remedial programs up to the end of 2010.

The results of environmental monitoring programs for the above period are provided in the report. Where applicable, historical environmental data has also been included and discussed as part of the overall assessment of the decommissioned sites.

If you have any questions or comments, please contact the undersigned at (306) 956-6784.

Yours truly,

Michael Webster
Reclamation Co-ordinator
Compliance and Licensing, SHEQ
Cameco Corporation

MW:ll

Attachments

c: Stony Rapids Conservation Officer – Saskatchewan Ministry of Environment (letter and cd)
G. Bihun – Ministry of Advanced Education, Employment and Labour (letter and cd)
G. Groskopf – Environment Canada (letter and cd)
M. Keast – Department of Fisheries & Oceans (letter and cd)
D. Classen – Urdel Limited (letter and cd)
W. Kelly – Northern Mines and Monitoring Secretariat (letter and report)
Northern Settlement of Uranium City (letter and report)

BEAVERLODGE PROJECT
Annual Report – Year 24 – Transition Phase
January 1, 2009 to June 30, 2010

BEAVERLODGE PROJECT

Cameco

Beaverlodge Project Annual Report

Year 24 – Transition Phase
January 1, 2009 to June 30, 2010

Prepared for:
Canadian Nuclear Safety Commission
Compliance Report for Licence: WFOL-W5-2120.0/2012
&
Saskatchewan Ministry of Environment
Compliance Report: Beaverlodge Surface Lease

Prepared and Submitted by:
Cameco Corporation

September 2010

BEAVERLODGE PROJECT

Cameco

Beaverlodge Project Annual Report

Year 24 – Transition Phase
January 1, 2009 to June 30, 2010

Prepared for:
Canadian Nuclear Safety Commission
Compliance Report for Licence: WFOL-W5-2120.0/2012
&
Saskatchewan Ministry of Environment
Compliance Report: Beaverlodge Surface Lease

Prepared and Submitted by:
Cameco Corporation

September 2010

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SECTION 1

INTRODUCTION

1.0 INTRODUCTION

This report, 2009-10 *Beaverlodge Mine-Mill Decommissioning Transition Phase Monitoring Annual Report*, is submitted in compliance with Canadian Nuclear Safety Commission (CNSC) Waste Facility Operating Licence WFOL-W5-2120.0/2012 issued to Cameco Corporation (Cameco) for the decommissioned Beaverlodge mine and mill site.

The report is also submitted in compliance with the Saskatchewan Beaverlodge Surface Lease Agreement dated December 24, 2006.

The report describes observations on the decommissioned Beaverlodge site covering the period between January 1, 2009 and June 30, 2010. Previous reports have covered a range spanning twelve months; however, this reporting period has been adjusted to accommodate an annual update meeting with the CNSC Commission scheduled for the fall of 2010. Subsequent annual reports during the current CNSC licence period, which expires in November 2012, will resume the twelve month reporting time period, covering the period from July 1st through the end of June in the following year.

Results of environmental monitoring programs conducted for Beaverlodge during this period are provided in the report and, where applicable, historical environmental data has been included and discussed as part of the overall assessment of the decommissioned properties. The status of current projects and activities conducted as of the end of June 2010 are provided along with an overview of anticipated activities planned for latter half of 2010.

SECTION 2

GENERAL INFORMATION

2.0 GENERAL INFORMATION

2.1 Organizational Information

2.1.1 CNSC Licence/Provincial Surface Lease

The CNSC Waste Facility Operating Licence WFOL-W5-2120.0/2012 and the Province of Saskatchewan - Beaverlodge Surface Lease, December 24, 2006 are issued to:

CAMECO CORPORATION
2121 - 11th Street West
Saskatoon, Saskatchewan
S7M 1J3
(306) 956-6200 (Phone)
(306) 956-6201 (FAX)

2.1.2 Officers and Directors

The officers and board of directors of Cameco as at June 30, 2010 are as follows:

Officers

Chief Executive Officer	- G.W. Grandey
President	- T. Gitzel
Senior Vice-President & Chief Operating Officer	- B. Steane
Senior Vice-President, Marketing and Business Development	- G. B. Assie
Senior Vice-President and Chief Financial Officer	- O.K. Goheen
Senior Vice-President, Corporate Services	- G. Issac
Senior Vice-President, Governance, Law and Corporate Secretary	- G.M.S. Chad

Board of Directors

V.J. Zaleschuk
J.H. Clappison
J.F. Colvin
J.R. Curtiss
G. S. Dembroski
D.H.F. Deranger
J.K. Gowans
G.W. Grandey
N.E. Hopkins
O. Hushovd
G.J.W. Ivanhy
A.A McLellan
N.A. McMillan
R.W. Peterson

2.2 CNSC Licence Amendment

During the 2004/2005 reporting period Cameco applied to the CNSC for a two year Waste Facility Operating Licence for the decommissioned Beaverlodge mine and mill site. The licence application to the CNSC was made for the possession, management and storage of nuclear substances remaining from the former mining and milling activities. The Beaverlodge site was previously licensed under a Mine Facility Decommissioning Licence (AECB-MFDL-340-0.2).

Based on the public hearings and its consideration of the matter, the CNSC was satisfied that Cameco was qualified to carry on the activity that the proposed licence would authorize. The Commission was also satisfied that Cameco, in carrying on that activity, would make adequate provisions for the protection of the environment, health and safety of persons, maintenance of national security and measures required to implement international obligations to which Canada has agreed.

As a result, the CNSC, pursuant to section 24 of the Nuclear Safety and Control Act, issued to Cameco, a Waste Facility Operating Licence WFOL-W5-2120.0/2007 for the decommissioned Beaverlodge mill and mine site in Northern Saskatchewan. The licence was valid until March 31, 2007 and was not suspended, amended, revoked or replaced during the licence period.

On September 15, 2006 Cameco requested an amendment to the current licence, extending its expiry date by nine months from March 31, 2007 until December 2007. The Commission, pursuant to section 24 of the Nuclear Safety and Control Act, granted an extension to Cameco, issuing Waste Facility Operating Licence WFOL-W5-2120.1/2009, expiring March 31, 2009.

On February 18, 2009 a public hearing was held in Ottawa, Ontario for the renewal of the license for the Beaverlodge mining and milling facility. The Commission decided to adjourn the hearing until November 2009 so that a plan, providing details and milestones on the long-term activities for the proposed three year license period, was available for consideration.

At the February 2009 hearing the Commission granted exemption from further CNSC licensing of five minor former Eldorado Beaverlodge properties. This action allowed the properties to be released by Saskatchewan Ministry of Environment (SkMOE) from further Decommissioning and Reclamation and to be transferred to the province of Saskatchewan's Institutional Control (IC) program. The Saskatchewan Ministry of Energy and Resources (SkMER) is now the responsible authority for the administration of the five properties in the IC Program as described in the provincial Reclaimed Industrial Sites Act.

Following the November 2009 hearing, the Commission granted Cameco a Waste Facility Operating License for the former Beaverlodge Mine and Mill site. The renewed licence WFOL-W5-2120.0/2012 is valid from December 1, 2009 to November 30, 2012.

2.3 Provincial Surface Lease

The current provincial surface lease for the decommissioned Beaverlodge properties was issued to Cameco on December 24, 2006 with an expiry date of December 24, 2026.

2.4 Background Information

The decommissioned Beaverlodge mine/mill properties are located north of Lake Athabasca, northeast of Beaverlodge Lake in the northwest corner of Saskatchewan at approximately N59° 33.730' and W108° 27.414' (Figure 2.4.1).

Uranium bearing minerals were first discovered in the Beaverlodge area of northern Saskatchewan in 1934. Since there was little demand for uranium at that time, further prospecting and development in the region was delayed for almost ten years until 1944 when Eldorado Mining and Refining Ltd., a crown corporation owned by the Government of Canada, commenced detailed exploration in the area of Fishhook Bay on the north shore of Lake Athabasca. Between 1944 and 1948 Eldorado Mining and Refining Ltd. continued to explore the area around Beaverlodge Lake discovering the Martin Lake and Ace Zones in 1946. In 1947 a prospecting incline was developed to explore the Ace ore body and the Dubyna claims were staked.

Exploration and initial development of a number of separate ore bodies continued until 1951 when Eldorado Mining and Refining Ltd. developed the Fay shaft and head frame. The following year the foundations were laid for a 450 t/day carbonate leach mill which started production in 1953. Mill production expanded to 680 t/day in 1954 and increased to 1800 t/day in 1956.

During mining the primary focus was on an underground area north and east of Beaverlodge Lake where the Ace, Fay and Verna shafts were located. Production from these areas continued until 1982. Over the entire 30 year production period (1952 – 1982) the majority of the ore used to feed the mill came from these areas, however a number of satellite mines, primarily in the Ace Creek watershed were also developed and operated for shorter periods of time. During the mill operating period approximately 60% of the tailings were placed into small water bodies within the Fulton Creek watershed with the remainder being deposited underground.

During the early years of operation uranium mining and milling activities conducted at the Beaverlodge site were undertaken using what were considered acceptable practices at the time. However, these practices did not have the same level of rigor for the protection of the environment as is currently expected. Although the Atomic Energy Control Board (AECB) licensed the Beaverlodge activities, environmental protection legislation and regulation did not exist either federally or provincially and therefore was not a consideration during the early operating period. It was not until the mid 1970's, some twenty-two years after operations began, that effluent treatment processes were initiated at the Beaverlodge site in response to discussions with provincial and federal regulatory authorities.

At the request of the AECB, a conceptual decommissioning plan was submitted in June 1981. On December 3, 1981 Eldorado Nuclear Limited (formerly Eldorado Mining and Refining Ltd.) announced that its operation at Beaverlodge would be shutdown.

Mining operations at the Beaverlodge site ceased on June 25, 1982 and the mill discontinued processing ores in mid-August 1982. At that time Eldorado Resources Limited initiated site decommissioning. The decommissioning and reclamation work was completed in 1985. Transition phase monitoring was initiated at that time and continues today.

On February 22, 1988 the Government of Canada and the Province of Saskatchewan publicly announced their intention to establish an integrated uranium company as the initial step in privatizing their respective uranium investments.

On October 5, 1988 Cameco Corporation, a Canadian Mining and Energy Corporation, was created from the merger of the assets of the Saskatchewan Mining Development Corporation and Eldorado Resources Ltd. Following the merger, management (monitoring and maintenance) of the decommissioned Beaverlodge properties became the responsibility of Cameco, while the Government of Canada, through Canada Eldor Inc. (CEI) retained responsibility for the financial liabilities associated with the properties.

In 1990 the corporate name was changed to simply Cameco Corporation (Cameco) with shares of Cameco being traded on both the Toronto and New York stock exchanges.

The management of the Beaverlodge monitoring program and any special projects associated with the properties is the responsibility of the Reclamation Co-ordinator, SHEQ - Compliance and Licensing, Cameco.

2.5 Confounding Factors

While Beaverlodge Lake is the receiving environment for water from the decommissioned Beaverlodge properties, it is also the receiving environment for contaminants discharged from at least nine other non-Eldorado abandoned uranium mine sites and one former uranium mill tailings area (Lorado Uranium Mining Ltd. mill site) within the Beaverlodge Lake watershed. These abandoned sites are being managed by Saskatchewan Research Council (SRC) and are currently in the process of being decommissioned.

Previous experience has shown that the abandoned sites are likely contributing some level of contamination (heavy metals and radionuclides) to the watershed and ultimately to Beaverlodge Lake and Martin Lake, particularly during spring runoff and periods of heavy precipitation.

SECTION 3

DECOMMISSIONED AND RECLAIMED AREAS ACTIVITIES

3.0 DECOMMISSIONED AND RECLAIMED AREAS ACTIVITIES

The performance of the decommissioned and reclaimed area of the Beaverlodge site is assessed by routinely scheduled sampling/analysis as well as routine inspections conducted by Cameco personnel and the Joint Regulatory Group (JRG). In addition, special monitoring/investigation projects are completed to assess the performance of specific components of the decommissioned areas. The following section outlines related activities around the Beaverlodge properties during the reporting period.

3.1 JRG

The JRG is comprised of representatives of various federal and provincial regulatory agencies including:

- Canadian Nuclear Safety Commission (CNSC);
- The Department of Fisheries and Oceans Canada (DFO);
- Environment Canada (EC); and
- Saskatchewan Ministry of Environment (SkMOE).

Four meetings were held with the JRG during the 2009-10 reporting period, with the primary purpose of the meetings to discuss the Beaverlodge workplan and to allow for comment on activities and submissions. A summary of the meetings is presented below.

March 26, 2009: JRG - Stakeholder Meeting (Saskatoon, Saskatchewan)

At the February 2009 Commission hearing Cameco committed to establishing the path forward with regard to the future work plans for the Beaverlodge facilities. On March 26, 2009 regulatory agents from the CNSC, SkMOE, EC, and DFO met with Cameco representatives and set a framework for developing an action plan and associated schedule for these activities.

Participants at this meeting defined the general spatial and temporal scope to contain the proposed plan and agreed that clear and consistent targets need to be established for the acceptance of the properties into the provincial IC program. There was agreement to limit the spatial extent for consideration of potential remedial options to the licensed facilities, in addition to Greer Lake and Ace Bay and Fulton Bay of Beaverlodge Lake which are impacted areas immediately adjacent to the licensed properties.

Discussions were held with regards to a remedial options workshop, to be facilitated by SRK Consulting, as well as the development of the Conceptual Site Model (CSM). With regards to the CSM, Cameco was to generate a request for proposal for the development of a basic CSM to be used as a tool for discussions with stakeholders. Workshop details were also reviewed, with emphasis on the format and workshop participants. Following the meeting, it was determined that the remedial options workshop was to be held in June 2009 (described in Section 3.6).

September 16, 2009: JRG meeting (Saskatoon, Saskatchewan)

A meeting was held to gain an understanding of what each group's expectations are for recovery of the licensed properties and surrounding area to a point where they would be acceptable for transference to IC. The meeting also aimed to create a preliminary list of activities and timelines to be undertaken to move toward meeting these expectations during the proposed license period and to develop an achievable plan to fill the information gaps identified during the Remedial Options Workshop.

In addition, discussions surrounding the development of a management framework and supporting documents were held. The management framework sets a mission to "Manage the decommissioned sites to achieve release from provincial decommissioning and reclamation requirements, meet requirements for exemption from CNSC licensing, and acceptance into the Province of Saskatchewan's Institutional Control (IC) program, while minimizing human and environmental risks to acceptable levels". The supporting Management Decision Flowchart provides a step-wise approach to assessing residual risk on the properties and determining if the residual risk is acceptable; requires additional assessment; or potentially, additional remediation; with the ultimate goal of transferring properties into the IC program.

The management framework as it related to Beaverlodge was subsequently presented to the CNSC Commission during the November 2009 hearing.

December 14, 2009: JRG meeting (Saskatoon, Saskatchewan)

A meeting was held to discuss the current water sampling program and to review the proposed water sampling program. In addition, discussions were held surrounding the Commissions Reason for Decision with a focus on the requirements for the path forward in 2010 leading up to the annual update meeting with the CNSC scheduled for the last quarter of 2010.

February 23, 2010: JRG meeting (Saskatoon, Saskatchewan)

Discussions in the February 2010 JRG meeting involved the schedule and workplan for activities to be held in 2010. Updates on the Quantitative Site Model (QSM) and conclusions from the flowing borehole program carried out in 2009 were provided, as well as discussion on the release strategy for the smaller properties. In addition, a presentation was made regarding the proposed white sucker program that was proposed for the spring of 2010.

A review of the work plan and schedule for 2010 was conducted, which included recent activities and regulatory approvals received. In particular, items receiving regulatory approval included the Martin Lake adit rehabilitation work and the proposed use of Bolger Pit for the burial of loose debris. The Gantt chart was reviewed with personnel present, in order to determine if the proposed activities were adequate and if the timelines were achievable. In addition, a discussion was held regarding a proposed white sucker study program to be initiated in the spring of 2010.

The progress of several studies was discussed including, a macrophyte program, the Ace Creek sediment program, and the Minewater reservoir baseline program. In addition several other proposed studies were discussed including the Country Foods Assessment, development of a Quantitative Site Model.

3.2 Regulatory Inspections

The performance of the decommissioned and reclaimed areas at Beaverlodge, described in this section, is determined by routine and non-routine visual inspections conducted by regulatory agencies and Cameco. Inspections are held in order to ensure that conditions on the properties do not impact the health and safety of people or protection of the environment and ensuring the requirements of the license are being met.

3.2.1 2009 Inspection

On May 21-22, 2009 representatives from the CNSC, the SkMOE and Cameco Corporation performed a Type II joint inspection of the Beaverlodge properties. The main objective of the inspection was to follow up on action items and recommendations from the previous inspection, and to observe other areas of interest with respect to further source controls. Areas visited included the Martin Lake Adit, Verna Lake, Verna Lake Shaft cover, Lower Lake, Hab/Pistol Lake, Dubyna Adit/Pit/Lake, Fookes Delta, Mill Hill (seeps and small pit), flowing boreholes near AC-14, Ace Stope area adjacent to Dorclone, Ace Shaft area, Minewater Reservoir, Unknown Lake, and TL-7.

3.2.2 2010 Inspection

Representatives from the CNSC, the SkMOE and Cameco Corporation performed a Type II joint inspection of the Beaverlodge properties from May 31 to June 3, 2010. As with previous inspections, the main objective was to follow up on action items and recommendations from the previous inspection, and to observe other areas of interest with respect to further source controls.

Areas visited during the 2010 inspection included: Fay Waste Rock Storage Area, Hab Mine – flow pathways, Dubyna Mine Site, AC-8, Martin Lake Adit (Beaverlodge Lake Side), 12 Zone Pit, Bolger Pit – Waste disposal trench, Fay flowing boreholes, Fookes Delta and Outlet Structure, Verna Shaft area, TL-7, Minewater Reservoir, and the Fay Mine – Shaft area.

3.3 Public Meetings

Two public meetings were held during the 2009-10 reporting period, with the intent of providing an overview of completed activities in the area as well as an update on the current status of the properties.

May 20, 2009: Public Meeting (Uranium City, Saskatchewan)

A re-licensing hearing of Beaverlodge was held in February 2009, in which the CNSC granted an eight month extension of the existing license. During the eight month timeframe the CNSC asked Cameco to provide more information on the plan for management of the area. As a result, during the public meeting Cameco representatives communicated with Uranium City residents the results of the CNSC meeting, provided an update to the community on issues around the Beaverlodge facilities, and organized an advisory group of Uranium City residents to work with Cameco to develop a remedial management plan.

Results from the Beaverlodge water sampling program were discussed, focusing on the water quality of Ace Creek and Fulton Creek outlets. Elements of concern that were presented graphically in the meeting included radium-226, uranium and selenium. Additional water quality information was made available for all stations and parameters to those interested.

Recent activities and inspections on the Beaverlodge properties were discussed. Meeting attendants were briefed on recent work on the Eagle property to address safety concerns raised by Uranium City residents. In addition, signage placed on a number of properties in the area was discussed. Signs were erected in response to a recent increase in exploration activity, and the need to clearly mark the boundaries of the CNSC licensed properties was detailed.

During the meeting, questions were posed to residents on most effective way to communicate pertinent issues to the community. Responses included public notice, email if possible, and website dedicated to specific issues. A sign-in sheet was handed out and those who wished to add their email address did so. Representatives from SkMOE discussed the new fish consumption advisory issued for Beaverlodge Lake and other waterbodies in the area. Questions were fielded from the public regarding the advisory, and the impact on other watersheds within the region.

An overview of the activities to be conducted in 2009 was presented, including the flowing borehole program, remedial options workshop, and development of the CSM. Cameco invited community leaders to select local representatives to participate in a remedial options workshop to be held later in the year.

May 31, 2010: Public Meeting (Uranium City, Saskatchewan)

In May of 2010, the spring public meeting was held at the Ben McIntyre School in Uranium City. Representatives from Cameco, as well as CNSC, SkMOE and the community were present for the presentation made by Cameco, which was followed by a question and answer period.

The history and background of the region were presented to the members in attendance, followed by an update on the activities conducted in 2009, results from the 2009 water sampling program, and planned activities for 2010.

It was noted during the meeting that five properties had been transferred into the provincial IC program, with long term funding in place to ensure funds are available for monitoring and unforeseen events. A number of studies completed in 2009 were discussed, including the Minewater Reservoir Aquatic Investigation, borehole plugging, Hab hydrology assessment, development of the management framework, and the LiDAR aerial survey.

Results from the 2009 water sampling program were presented, focusing on several stations in the Beaverlodge region including AC-8, AC-14, and TL-9.

Following presentation of the water quality results, the planned activities for 2010 were presented. It was demonstrated that several of the planned activities in 2010 came directly from the remedial options workshop held in June 2009. Included in this presentation were the Martin Lake adit rehabilitation, development of the ArcGIS database, white sucker spawning assessment, the site wide flowing borehole investigation, the geotechnical assessment of several properties, and a country foods assessment.

The proposed path forward for the 2010 activities, as well as a discussion designed to improve the communication between the community and Cameco concluded the spring 2010 meeting. Options presented to improve the communication included e-mails, newsletters or posters.

3.4 EQC

The Northern Saskatchewan Environmental Quality Committee (EQC) is made up of representatives from designated northern municipal and First Nation communities. The committee enables northerners to learn about uranium mining activities and to see first-hand the environmental protection measures being employed, and the socio-economic benefits being gained. Activities involving the EQC are outlined below.

June 12, 2009: EQC Update Meeting (La Ronge, Saskatchewan)

In June of 2009 an EQC meeting was held in La Ronge, to update EQC members on the status of all Cameco mining operations in Saskatchewan. During this meeting, a brief update was made with regards to Beaverlodge properties and associated activities. Representatives from Cameco were present, as well as the members of the EQC.

The meeting consisted of a powerpoint presentation, followed by a question and answer period. In the presentation, a brief history and background on the area was given, followed by an overview of recent activities and inspections conducted in the area.

Recent activities and inspections on the Beaverlodge properties were discussed, specifically dealing with the final inspection of satellite properties proposed for exemption from CNSC licensing. Meeting attendants were briefed on recent work on the Eagle property to address safety concerns raised by Uranium City residents. In addition, signage placed on a number of properties in the area was discussed. Signs were erected in response to a recent increase in exploration activity, and the need to clearly mark the boundaries of the CNSC licensed properties was detailed.

An update on the one-day public hearing regarding the re-licensing of the Beaverlodge properties was presented, including the path forward to the next meeting that was to be held in November 2009.

The eventual transference of properties into the provincial IC program was discussed, including an overview of the IC program and how it relates to the Beaverlodge properties. An overview of the activities to be conducted in 2009 was also presented, including the flowing borehole program, remedial options workshop, and development of the CSM. Following the presentation, there was a question and answer period held between Cameco representatives and members of the EQC.

October 7, 2009: EQC (Uranium City, Saskatchewan)

A joint meeting was held at the Uranium City community school on October 7, 2009 involving representatives from Cameco as well as the Saskatchewan Research Council (SRC). Cameco representatives made a presentation to the Uranium City residents, followed by a question and answer period.

Cameco discussed the 2009 activities and the Day 2 re-licensing hearing scheduled for November 5, 2009. Other topics of discussion included the IC program, results from the remedial options workshop, the decision making flowchart and the path forward.

Remedial options workshop goals were presented to the audience, who were informed that a list of potential studies had been developed, intended to fill any gaps in the current information base. Following this discussion, activities that had been undertaken in 2009 to support the action plan for the Beaverlodge properties were discussed including the borehole plugging, conceptual site model development, Ace Creek study, LiDAR survey and the placement of warning signs on several properties.

Results from the 2009 JRG meetings were discussed, focusing on the development of the decision-making framework and its relation to the management of the Beaverlodge properties. The path forward for the licensing period was presented, which included the development of a list of studies to complete during the proposed licence period to fill information gaps.

Following the presentation by Cameco, representatives from SRC made a presentation which was followed by a site tour of the Beaverlodge properties with an opportunity for participants to ask questions regarding the activities occurring on the site.

After the meeting, Cameco hosted a tour of the Beaverlodge properties for the members of the EQC. EQC members were shown and presented information as it pertains to the several properties in the Beaverlodge area. A walking tour was conducted on several properties, allowing for individuals to see a number of elements associated with each property.

Representatives from Cameco guided EQC members, and answered a number of questions pertaining to the Beaverlodge properties.

3.5 Canada Eldorado Inc.

Representatives from Canada Eldorado Inc. were given a tour of the Beaverlodge properties currently being managed by Cameco on their behalf, from July 20-22, 2009.

3.6 Other Activities

May 19, 2009: Door-to-Door Survey (Uranium City, Saskatchewan)

A survey was conducted in Uranium City to follow up on the 2003 Human Health Risk Assessment (HHRA) information. Residents were asked questions regarding HHRA and given the opportunity to discuss their issues or concerns related to the Beaverlodge facilities.

Results from the door-to-door survey indicated that the majority of residents did not frequent the Beaverlodge properties, nor were they aware of the existing levels of risk on the decommissioned properties.

May 21 - 25, 2009: Temporary Plugging of Boreholes (Beaverlodge Properties)

Temporary packers were installed by Golder Associates Ltd. in six previously identified flowing boreholes located on the Beaverlodge properties. The overall objective of the program was to close off flows from these boreholes, in order to reduce contaminant loading to the receiving environment. Other non-flowing boreholes were identified in the area and were monitored for changes in flow status.

June 17-18, 2009: Remedial Options Workshop (Saskatoon, Saskatchewan)

Cameco hosted a workshop in Saskatoon to consult with identified Beaverlodge stakeholders on the process of developing and assessing potential options for additional remediation of the former Eldorado Beaverlodge properties.

Five Uranium City residents were selected by their community to represent the region. The Metis Nation Saskatchewan (MN-S) was represented by the Uranium City local vice-president, the regional director from La Ronge, and their consultation co-ordinator, based in their Saskatoon office. Also present were representatives from the Athabasca EQC, representing Athabasca region communities. In addition to northern Saskatchewan representatives, attendees included Cameco employees, third-party experts, a representative of the provincial Northern Mines Monitoring Secretariat, as well as regulatory representation from the CNSC, the SkMOE and EC.

This workshop brought stakeholders into the process of assessing potential options for additional remediation of the former Eldorado Beaverlodge sites. A list of potential remedial options was developed and from that list gaps in the current information base were identified and compiled. The workshop also identified the most significant information gaps and prioritized studies to obtain the missing information.

The scenarios developed in the workshop were not intended to be a definitive set for selecting the final remediation options. Rather, the scenario development exercise assisted in the identification of uncertainties to be addressed before a determination can be made as to the necessity or appropriateness of further remedial actions.

September 2009: Conceptual Site Model

A Conceptual Site Model (CSM) was developed by SRK Consulting (Canada) Inc. that provides a summary of the former Eldorado Beaverlodge properties. The CSM was developed as a tool to assist in the evaluation of contamination issues at the sites and to provide background for an initial assessment of potential further remediation options for individual properties at the sites.

The CSM provides a basic overview of the interaction between contaminant sources and the surrounding environment, and is intended to be an informative tool, not a predictive tool. The CSM will be used as a tool to inform stakeholders of the interaction of various components of the environment and support risk based decisions regarding potential additional remediation of historical contaminant sources at the properties.

It is anticipated that the CSM will evolve as it is reviewed and discussed by various stakeholders (including regulatory agencies) and as additional historical and field data are evaluated and as the data quality objectives are updated and refined.

The Beaverlodge CSM contains a series of diagrams that depict a general three-dimensional model of the environmental system and the physical, chemical, and biological processes that determine the transport of contaminants from all sources to receptors. The CSM identifies assumptions used in site characterization, documents the relevant exposure pathways at the site, provides a template to conduct the exposure pathway evaluation and identifies relevant receptors and endpoints for evaluation in the receiving environment (e.g. air, soil, groundwater, surface water, sediment, and biota).

Essentially, a CSM traces the movement of contaminants from various sources through the ecosystem to potential human and ecological receptors (USEPA 1997). The CSM is an important element for evaluating risk and risk reduction approaches and a valuable tool to evaluate the potential effectiveness of remedial alternatives (CSMWG 2000; USEPA 2005; EC-MOE 2008).

Overall, a CSM provides a tool for site managers and planning teams to examine the contamination issues at a particular site and provides the basis for identifying and evaluating the potential risk to human health and the ecosystem.

Based on information gathered during the 2009 field programs and the development of a GIS based computer model for Beaverlodge, Cameco revised the original version and issued an update “CSM Eldorado Beaverlodge Properties Report - Revision 1”, in May 2010.

October 2009: Closure of a Decommissioned Bulk Petroleum Fuel Storage Tank

An application was made in April of 2003 to the SkMOE (known as Saskatchewan Environment in 2003) involving the decommissioning of the bulk petroleum storage fuel tank located at Bushell Bay, near Uranium City. The *Approval to Decommission Petroleum Storage Facilities Based on Future Land Use* was subsequently issued from the SkMOE on May 6, 2003. Upon receiving the approval to decommission, the removal of all residual sludges, dismantling and removal of the tank, transporting and disposal of the materials was completed in August of 2003.

Upon completion of the decommissioning activities, soil samples were collected and submitted to the SRC for analysis. The results indicated that all sampling locations met the established criteria, with the exception of one sample located directly under where the tank was previously located. Follow up sampling at the station in question occurred in 2004, 2005 and July 21, 2009. Results from the July 2009 sampling event indicated that all levels were currently below the *Tier 1 Risk-Based Criteria for Petroleum Hydrocarbons Impacted Soil* and on October 27, 2009 the SkMOE sent notification that the property encompassed by the site investigation has been remediated to the standards set out by the SkMOE.

December 2009: LidDAR Data Collection

In order to meet current and future reclamation objectives for the Beaverlodge properties, accurate and detailed topographic information for environmental assessments and engineering purposes is required. To obtain such information Golder Associates Ltd. was contracted to partner with Terrapoint Canada to use Light Detection and Ranging (LiDAR) in order to collect data for four discrete areas totaling 41.75 km^2 in the vicinity of the Beaverlodge properties. The collected data provides three dimensional data sets that can be applied using GIS software to create topographic images.

The information gathered from this survey will have multiple uses such as determining the feasibility of the remedial options using desktop software and aiding in the delineation of study areas for other programs. It is intended that data collected from the LiDAR survey will be used to feed into the ArcGIS database and serve as a communication tool during future interactions with the general public or the regulatory agencies.

April 2010: Installation of Signage at the Beaverlodge Properties

In response to the door-to-door campaign completed on May 19, 2010 in Uranium City, which indicated the local people were generally unaware of the risks posed at the decommissioned Beaverlodge sites, warning signs were installed throughout the Beaverlodge properties to identify the site and its associated risks. Signs are intended to increase public safety and awareness around Beaverlodge sites.

May 2010: Martin Lake Adit Rehabilitation

During a Cameco inspection conducted on October 10, 2008 a small opening was noted in the backfill of Martin Lake adit (Beaverlodge Lake side). The adit was inspected again the following year on May 21/22, 2009. The opening had not increased in size and was not judged to be an immediate health and safety concern; however, Cameco committed to properly closing the adit. On November 26, 2009 a submission was made to the agencies outlining the plan for rehabilitating the adit. Upon receiving approval from the regulators to proceed with the rehabilitation, a local contractor (Uranium City Contracting Ltd.) was hired to complete the work. This work was completed in May 2010 and inspected by the JRG during the June 2010 inspection.

3.7 Studies

August 2009: Ace Creek Characterization

In August of 2004, a study was conducted in order to characterize the four sub-watersheds that flow into Ace Lake in addition to characterizing the lower reach of Ace Creek between the Ace Lake discharge at AC-8 and the Ace Creek discharge to Beaverlodge Lake at AC-14.

As a follow up to the 2004 program, a study was held in 2009 to further characterize the lower reach of Ace Creek between the Ace Lake discharge at Station AC-8 and the Ace Creek discharge to Beaverlodge Lake at Station AC-14.

Analysis of the water samples collected in August of 2009 confirmed an increase in uranium concentrations between those stations sampled in 2004; however, the increase occurred further downstream than initially considered. Results from the 2009 survey concluded the increase occurred between AC-13B (18 µg/L) and AC-13A (24 µg/L).

Results from the 2009 Ace Creek survey were presented to the CNSC and SkMOE on December 16, 2009. It was concluded that due to the proximity of the three identified waste rock pile seeps to AC-13A, it is likely that seepage from the waste rock pile is contributing to the increase in uranium concentration observed between AC-13B and AC-13A.

August/September 2009: Macrophyte Study

Canada North Environmental Services were contracted to perform a macrophyte survey of the Beaverlodge study area. This study involved the collection and mapping of aquatic macrophytes in the region, as well as the chemical analysis of the sediment, roots, and shoots.

The main objective of the study was to collect detailed information on aquatic macrophyte community composition and chemistry from reference and exposure waterbodies in the Beaverlodge study area. This information will aid in the establishment of site specific transfer factors, which will in turn be used in risk assessment modelling to assess potential risks to wildlife consuming aquatic macrophytes. In addition, documenting aquatic macrophyte community composition and density will assist in planning future wildlife investigations in the Beaverlodge area.

A draft report from the macrophyte study is expected in the 3rd quarter of 2010 and will be provided to the regulatory agencies once complete.

September 2009: Aquatic Investigation of Minewater Reservoir

In September of 2009 Canada North Environmental Services was contracted to perform an aquatic investigation of the Minewater Reservoir. The objective of this study was to characterize the aquatic environment of Minewater Reservoir so that informed decisions can be made regarding remedial options. To meet this objective, the following components were surveyed in September 2009: bathymetry; water and sediment quality; dominant aquatic macrophytes; and benthic invertebrate and fish communities. The fieldwork was completed in September 2009, and a report provided to Cameco in July 2010. Submission of this report to the regulatory agencies is expected in the 3rd quarter of 2010.

Water quality results from the Minewater Reservoir investigation found that uranium and selenium concentrations in surface water exceeded provincial and federal guidelines for the protection of aquatic life. Concentrations of several metals and trace elements, radium-226, inorganic ions, specific conductance, and TDS in the water column were substantially elevated relative to non-impacted Fulton Lake.

Results from the sediment portion of the investigation found that the levels of 12 analytes (metals, trace elements, and radionuclide activities) in sediment exceeded the applicable guidelines for the protection of aquatic life. Only cadmium and zinc concentrations were below guidelines. Concentrations of uranium, selenium, and strontium in the 0-2 cm sediment layer were slightly higher than in the deeper (2-4 and 4-6 cm) sediment layers. These analytes occurred in elevated concentrations in both the water column and the upper sediment horizon.

The benthic invertebrate assemblage in Minewater Reservoir was similar to those of the other exposure waterbodies in the Fulton Creek drainage, in that they are numerically dominated by chironomid midges. In addition, there were no fish captured in Minewater Reservoir despite repeated capture attempts made at various locations during two days of fishing effort using multiple capture methods, demonstrating that no fish reside in Minewater Reservoir.

September 2009: Ace Bay Contamination Delineation

Ace Bay of Beaverlodge Lake received incidental tailing exposure through the operating period of the Beaverlodge mill. To delineate tailings exposure, three 1 kilometre transects were established in Ace Bay, radiating out from the Ace Creek inflow. Along each transect, sampling stations were established for sediment and benthic invertebrates.

The main objective of the investigation was to delineate spatial concentration gradients of the target analytes, selenium, uranium, and radium-226, in Ace Bay sediments according to the distance from the outflow of Ace Creek and according to horizon depth. This will allow for a determination of contaminant dissemination through Ace Bay according to the proximity from the contaminant source (Ace Creek) and to assess whether contaminant concentrations in sediment have decreased, increased, or remained stable through time by comparing concentrations between horizon depths.

Additional temporal investigations compared concentrations of target analytes measured in 2009 to those measured in Ace Bay in 2006 to determine whether the concentrations have changed through time.

The current study also investigated additional aspects of sediment chemistry in Ace Bay, as well as benthic invertebrates inhabiting sediment in Ace Bay. The additional chemical analyses focused on gathering further information on selenium in the sediment by measuring differences in selenium concentrations in different particle size fractions and examining selenium speciation in Ace Bay sediment to help understand the bioavailability of selenium from the sediments. Thorium-230 activity levels in the sediment were also analyzed in a subset of samples to determine how they were related to radium-226 activity levels.

Benthic invertebrate community analyses, as well as the analyses of selenium concentrations in benthic invertebrates, were performed to better understand the potential biological impacts of selenium concentrations in the sediment of Ace Bay. A draft report from the survey is expected in the 3rd quarter of 2010 and will be provided to the regulatory agencies once complete.

September/October 2009: Hab Hydrology Investigation

Golder Associates Ltd. was contracted to perform a flow pathway investigation at the decommissioned Hab mine site. The primary objective of this investigation was to identify potential flow pathways of water draining from Beatrice Lake through the footprint of the former Hab Mine site and discharging to Pistol Lake. During the program, two surface flow paths were identified leaving Beatrice Lake. Flow from the main channel, which carries the larger water volume, was completely infiltrated at a ground surface/waste rock interface, and the secondary outlet carried a small amount of flow.

Tracer released into the stream entering the waste rock was not measured in Pistol Lake or the pond immediately upslope of Pistol Lake despite several repeated attempts. It was concluded that the tracer may have entered underground workings, where a residence time of weeks or months may have precluded detection of the tracer over the investigation period.

It was also observed that water samples taken from Beatrice Lake, Pistol Lake, and the small pond near Pistol Lake confirm that the water in those surface features are chemically similar in terms of major ions, while the downstream waterbodies have significantly higher levels of uranium and radium-226. Levels of these two parameters in Pistol Lake were approximately half those measured in the small pond. Results from the Hab Hydrology investigation were submitted to the CNSC and SkMOE on May 12, 2010.

February 2010: Use of Bolger Pit for burial of loose debris

During a regulatory inspection completed in 2006, a number of areas were identified by the SkMOE where loose debris and materials left behind during decommissioning required clean-up. It is anticipated that these materials, associated with the former mining and milling activities, will be removed as apart of clean-up activities.

Prior to commencing additional clean-up activities, Cameco sought approval from SkMOE and the CNSC to use Bolger Pit as a location to dispose of loose debris encountered during clean-up activities. SkMOE and CNSC approval was received in February 2010, and in the spring of 2010 a trench was excavated in the pit. To prevent unauthorized access to the disposal site, a locked gate was installed at the entrance to Bolger Pit.

May 2010: Monitoring of Packed Boreholes and Streamflows

In May 2009, exploration drill holes near the Ace-Fay Shaft and Mill complex that were known to be discharging groundwater were sealed with temporary packers by Golder Associates Ltd.. A detailed ground survey was performed in the fall of 2009, to observe any changes in the vicinity of the packed boreholes, including other known boreholes that did not have any previous discharge.

It was concluded from the 2009 survey that packer installation was successful in eliminating nearly all of the flow originating from the boreholes and draining to Beaverlodge Lake. No new flowing boreholes or seeps were observed during detailed site reconnaissance conducted nearly four months after the packer installation was completed. As such, Cameco informed

SkMOE that the packers would remain in place for an additional year of monitoring, including detailed ground surveys in the spring and fall of 2010, as well as continued monitoring of the water level in the Ace-Fay Shaft.

In the spring of 2010 Golder Associates Ltd. was retained to perform monitoring of the packed boreholes in the vicinity of the Ace-Fay Shaft and Mill Complex as well as discharge monitoring for streams flowing into and out of Ace Lake. During the spring investigation, two new seeps were identified downstream of the previously identified seeps. The seeps were marked in the field, and will be the focus of follow up investigations in the fall of 2010.

In addition, Golder installed and removed monitoring equipment at TL-7 and checked the accuracy of the AC-8 monitoring station currently in operation. Results of the program are to be provided in the fourth quarter of 2010.

May 2010: Quantitative Site Model

Cameco has initiated the development of a Quantitative Site Model (QSM) regarding the Beaverlodge properties. As mentioned previously Cameco and SRK Consulting developed a conceptual site model in 2009. In 2010 SENES Consultants Limited has been retained to develop a QSM which takes the environmental interactions described in the CSM and incorporates numerical monitoring information, contaminant transport and pathways modeling, to develop a predictive tool for the recovery of Beaverlodge properties. Ultimately, the QSM will be used as a tool to support risk based decisions regarding additional remediation of historical contaminant sources at the properties, and for tracking the progress of environmental recovery. The final version of the QSM is expected to be delivered in April 2011.

May/June 2010: White Sucker Spawning Study

In the spring of 2010 CanNorth Environmental Services was contracted to perform a white sucker spawning study in the vicinity of the Beaverlodge site. The objective of the study was to determine whether white sucker spawning populations in Ace Creek are self-sustaining by comparing the health of the spawning populations in this creek to spawning populations in reference creeks. In addition, the concentrations of metals and radionuclides in lake trout and white sucker tissue will also be investigated. A draft report detailing the results of the program is anticipated at the end of the 3rd quarter of 2010, with a final report expected to be submitted to the JRG in the 4th quarter 2010.

May/June 2010: Geotechnical Assessment

SRK Consulting (Canada) Inc. was contracted to perform a geotechnical assessment of various Beaverlodge properties associated with the former mining/milling facilities. The objective of the assessment was to assist Cameco in understanding the potential residual risks associated with some of the properties and to determine the reasonableness of potential remedial options.

Included in this assessment was; a pit wall stability and hazard assessment, waste rock stability assessment, Verna/Zora channel assessment, and an analysis of potential diversion channels. Results from the geotechnical assessment are anticipated in the fourth quarter of 2010 and will be provided to the JRG.

As part of the geotechnical assessment, SRK will be conducting research and summarizing existing national and international standards and methods of testing in-situ concrete exposure caps, as well as preparing a draft Beaverlodge specific protocol for such testing.

May/June 2010: Flowing Borehole Investigation

In May of 2010 SRK Consulting (Canada) Inc. completed a flowing borehole investigation on the former Eldorado Beaverlodge properties. The intent of the investigation was to record the location and condition of each borehole and identify all holes that are exhibiting an artesian condition in which groundwater associated with flooded underground workings is reporting to the surface.

As part of the investigation, a review of existing historical exploration drill records was performed, as well as conducting field confirmation at each of the former Eldorado Beaverlodge properties for the presence/absence of exploration drill holes. Drill holes were characterized in terms of location, condition, and presence/absence of surface discharges. In addition, an identification system was developed with each borehole labeled in the field.

Results from the flowing borehole investigation are expected in the second half of 2010, and will be provided to the JRG.

May/June 2010: Three Year Inspection of Fookes and Marie Reservoir Outlet Channels and Fookes Lake Delta

SRK Consulting (Canada) Inc. carried out the three year site inspection of the outlet channels at Fookes and Marie Reservoir in May of 2010. The objective of the inspection was to evaluate the condition of the outlet channels and compare their actual versus predicted performance. In addition, the Fookes Lake tailings delta was inspected in order to assess the performance of the cover since 2007. The results of the inspection are presented in Section 4.7.

SECTION 4

ENVIRONMENTAL MONITORING PROGRAMS

4.0 ENVIRONMENTAL MONITORING PROGRAMS

Cameco retains a local contractor (Urdel Ltd.) to conduct the required geotechnical, water quality and radon sampling throughout the year. Employees from Urdel Ltd., while collecting samples, also performed cursory inspections and reported any unusual conditions to Cameco.

4.1 Close-Out Objectives and Requirements

In 1982 Eldorado Nuclear Limited submitted a document which described their approach to decommissioning and reclamation of the Beaverlodge site (ERL June 1982). This document included the proposed close-out objectives (COOs). The AECB then issued close out requirements and objectives specific to the close-out of the Beaverlodge operation (AECB, 1982).

Table 4.1.1 provides a summary of the water quality COOs as originally established by the AECB in 1982 (AECB 1982). In the interest of completeness, the table also provides a summary of the most recent *Saskatchewan Surface Water Quality Objective for the Protection of Aquatic Life* and *General Surface Water Quality Objectives* (Saskatchewan Environment, 2006), the *Canadian Water Quality Guidelines for the Protection of Aquatic Life* (CCME, 2006), the *Saskatchewan Municipal Drinking Water Quality Objectives* (2002) and the *Guidelines for Canadian Drinking Water Quality* (Health Canada, 2007).

As indicated in Section 2.3.3 of Volume 5, *Plan for the Close-Out of the Beaverlodge Site,* (ERL 1983b) it is predicted that at Station TL-7, Radium (^{226}Ra) and Total Dissolved Solids (TDS) will not meet the COOs at any point in the foreseeable future and uranium (U) concentrations are expected to meet the COOs only in the long-term (*i.e.* >200 years). The estimated operational loadings are summarized in Table 4.1.2.

4.2 Transition Phase Monitoring

Over the history of the transition phase monitoring, the results of four separate monitoring programs have been evaluated to assess the performance of the closed-out site. These are water quality, ambient radon, air quality and gamma radiation surveys.

In 2009-10 only two environmental monitoring programs continue:

1. Water quality; and
2. Ambient radon.

The air quality monitoring program for dust fall and high volume sampling was completed in the third year of the transition phase monitoring. The original gamma radiation surveys were completed in the first year of the transition phase (1985/86) and are now only conducted in specific areas in support of applications to release specific properties from decommissioning and reclamation.

The following sections summarize results for the remaining monitoring programs of water and ambient radon.

4.3 Water Quality

This section discusses summary results for water quality parameters of interest at 13 sampling stations from July 1982 to June 2010. Historical as well as current monitoring results are used to evaluate trends and assess performance with respect to the COOs. Where applicable, comparisons are also made with the original water quality modeling predictions made in 1983 (SENES 1983) and the revised predictions made in 2003 (SENES 2003).

Annual averages were calculated for the 2009-10 reporting period; however, due to complexities with the environmental database this date range could not be charted alongside the previously reported annual averages. As such, the figures presented in the following section break the results into a mean annual average for 2009, and a six month mean for 2010. In addition, sampling deviated from the routinely scheduled monitoring program once during the reporting period, with the scheduled June 2009 water sample was not collected until July.

The watersheds affected by the historical Eldorado Mining activities are Ace Creek and Fulton Creek. Within the Ace Creek watershed the routine sampling stations (from upstream to downstream) include:

- **AN-5** - Pistol Creek below the decommissioned Hab mine site;
- **DB-6** - Dubyna Creek downstream of the decommissioned Dubyna mine site and before the creek enters Ace Creek upstream of Ace Lake;
- **AC-8** - Ace Lake outlet to Ace Creek; and
- **AC-14 -** Ace Creek at the discharge into Beaverlodge Lake.

In May of 2010, Cameco began monitoring water quality at the Verna Lake discharge to Ace Lake. This station has been labelled as AC-6A, and will be a component of the environmental monitoring program moving forward.

The Fulton Creek watershed contains the bulk of the decommissioned tailings deposited during operations. Within the Fulton Creek watershed the permanent, routinely sampled stations (from upstream to downstream) include:

- **AN-3** Fulton Lake (represents un-impacted or background condition);
- **TL-3** Discharge of Fookes Reservoir;
- **TL-4** Discharge of Marie Reservoir;
- **TL-6** Discharge of Minewater Reservoir (which flows into Meadow Fen);
- **TL-7** Discharge of Meadow Fen upstream of Greer Lake; and
- **TL-9** Fulton Creek below the discharge of Greer Lake and before it enters Beaverlodge Lake.

Additional permanent sampling stations located downstream of the Beaverlodge site include:

- **BL-3** located in Fulton Bay, Beaverlodge Lake immediately opposite the Fulton Creek discharge;
- **BL-4** located in a central location within Beaverlodge Lake; and
- **AN-4** located in Martin Lake.

Figure 4.3.1 provides an overview of the various stations at which water quality is monitored.

Figures 4.3.2 to 4.3.51 are graphical representations of the historical annual average concentrations of U, ^{226}Ra, Se and TDS at each station. In the interest of completeness, where data collected during the final six years of operation (1977-1982) was available it has also been included in the graphs.

Table 4.3.5 compares the mean concentrations for the various stations over the 18 month period from January 2009 through June 2010 to the COOs, where applicable.

Total environmental loadings of U, 226Ra and TDS to Beaverlodge Lake in 2009-10 have been calculated and compared with the loadings estimated during operations and the predicted loadings at the shut down of the facility. Loadings calculations and comparisons are presented in Section 4.4.2.

The results of detailed analysis and the annual averages for the current reporting period (January 2009 to June 2010) are provided in Appendices A and B respectively.

4.3.1 Ace Creek Watershed

AN-5

Station AN-5 is located in Pistol Creek downstream of the decommissioned Hab satellite mine. It is one of the four stations identified in the Eldorado decommissioning documents (Eldorado 1982) at which COOs are applied.

During the 2009-10 reporting period, all parameters met COOs with the exception of ^{226}Ra. The average concentration in 2008 as well as the January 1, 2009 to June 30, 2010 period is shown below:

Parameter	Units	2008 Average Concentration	2009-10 Average Concentration	Close Out Objective
U	mg/L	0.30	0.14	0.25
^{226}Ra	Bq/L	1.02	1.05	0.11
TDS	mg/L	185	168	250
Se	mg/L	0.0001	0.0002	-

Selenium values at AN-5 have followed the trend observed in previous years, continuing to meet SSWQO since 2004. TDS values have shown seasonal fluctuation but have remained consistent since 2000. As with TDS values, U concentrations exhibit seasonal fluctuation as well and are currently below the COO. It should be noted that the mean concentration of U in 2009-10 was the lowest recorded value at this station. ^{226}Ra values have shown a considerable fluctuation since 1990, with 2009-10 values being similar to concentrations measured in 2008.

A historical summary of U, ^{226}Ra, TDS and Se concentrations at AN-5 are presented in Figures 4.3.2 to 4.3.5.

DB-6

Station DB-6 is located in Dubyna Creek downstream from the decommissioned Dubyna satellite mine before the creek enters Ace Creek, upstream of Ace Lake. It is one of the four stations identified in the Eldorado decommissioning document (Eldorado 1982) at which COOs are applied.

All parameters were below the established COOs for the 2009-10 reporting period at this station. The average concentration in 2008 as well as the 2009-10 reporting period is shown below:

Parameter	Units	2008 Average Concentration	2009-10 Average Concentration	Close Out Objective
U	mg/L	0.28	0.22	0.25
^{226}Ra	Bq/L	0.04	0.03	0.11
TDS	mg/L	153	152	250
Se	mg/L	0.0001	0.0002	-

Annual average ^{226}Ra and TDS have met the COOs since 1981 and 1983 respectively. Concentrations of these parameters recorded during the 2009-10 reporting period remained relatively stable compared to the previous year's annual average. Selenium values at DB-6 remain relatively consistent, and have met the SSWQO since 2004. Uranium concentrations at DB-6 are currently below the COO, and have shown a decreasing trend since 2000. It should be noted that the mean uranium concentration for the 2009-10 reporting period was the lowest recorded value since decommissioning.

A historical summary of U, ^{226}Ra, TDS and Se annual average concentrations for station DB-6 are presented in Figures 4.3.6 to 4.3.9.

AC-8

Station AC-8 is located at the discharge of Ace Lake into Ace Creek. Ace Lake is the receiving environment for waters discharged from DB-6 and AN-5. Mean concentrations observed during 2008 and 2009-10 are detailed in the table below.

Parameter	Units	2008 Average Concentration	2009-10 Average Concentration
U	mg/L	0.02	0.01
^{226}Ra	Bq/L	0.01	0.02
TDS	mg/L	64	76
Se	mg/L	-	0.0001

Concentrations of U, ^{226}Ra and TDS have remained relatively stable at this station since 1982. Selenium became a part of the routine monitoring program at AC-8 in August of 2009. During the 2009-10 reporting period, mean concentrations of uranium (0.014 mg/L) and selenium (0.0001 mg/L) at AC-8 were below the SSWQO.

A historical summary of U, ^{226}Ra, and TDS annual average concentrations for station AC-8 are presented in Figures 4.3.10 to 4.3.12.

AC-14

AC-14 is located in Ace Creek at the discharge into Beaverlodge Lake. It is one of the four stations identified in the Eldorado decommissioning document (Eldorado 1982) at which COOs are applied. Annual average concentrations of U and TDS measured at this station have consistently been below the COOs since the decommissioning of the Beaverlodge mine/mill complex. Concentrations of ^{226}Ra remained above the COOs until 1990-91 and have been near or below the objective since 1991.

During the 2009-10 reporting period, all parameters were below the COOs. Results from the 2008 and 2009-10 reporting period are illustrated in the table below.

Parameter	Units	2008 Average Concentration	2009-10 Average Concentration	Close Out Objective
U	mg/L	0.03	0.02	0.25
^{226}Ra	Bq/L	0.05	0.03	0.11
TDS	mg/L	72	79	250
Se	mg/L	0.0002	0.0001	-

Modeling conducted for Eldorado Nuclear Ltd. during the original decommissioning established estimated concentrations for three parameters (SENES 1983). During the 2009-10 monitoring period the annual average U, ^{226}Ra and TDS concentrations at AC-14 were less than the concentrations predicted at shutdown, minimum reclamation and for the maximum reclamation scenarios (see Table 4.3.6).

Selenium levels at AC-14 continue the trend observed in previous years, continuing to meet SSWQO since 2000. In addition, ^{226}Ra concentrations have shown a decreasing trend over the past several years, with the December 2009 value (0.005 Bq/L) the lowest recorded value at this station since decommissioning was complete.

A historical summary of U, ^{226}Ra, TDS and Se annual average concentrations for station AC-14 are presented in Figures 4.3.13 to 4.3.16.

4.3.2 Fulton Creek Watershed

AN-3

AN-3 is located downstream of Fulton Lake prior to Fookes Reservoir and was not impacted by mining activities in the area. Water quality at this station is typical of background water quality in the region. Mean concentrations from the 2008 and 2009-10 reporting periods are detailed in the table below.

Parameter	Units	2008 Average Concentration	2009-10 Average Concentration
U	mg/L	0.002	0.002
^{226}Ra	Bq/L	0.005	< 0.005
TDS	mg/L	94	89
Se	mg/L	0.0001	< 0.0001

As expected with a reference location, concentrations of U, TDS, Se and ^{226}Ra recorded at AN-3 have remained relatively stable and consistent. Selenium concentrations at AN-3 have been at or below detectable laboratory limits since routine analysis began in 2000.

A historical summary of U, ^{226}Ra, TDS and Se annual average concentrations for station AN-3 are presented in Figures 4.3.17 to 4.3.20.

TL-3

TL-3 is located at the discharge of Fookes Reservoir and is the first sampling location in the recovering tailings management system area. During the 2009-10 reporting period, the mean concentrations of U, ^{226}Ra and TDS remained relatively stable in comparison to the 2008 values. Mean concentrations from the 2009-10 and 2008 reporting periods are shown in the table below.

Parameter	Units	2008 Average Concentration	2009-10 Average Concentration
U	mg/L	0.42	0.38
^{226}Ra	Bq/L	1.12	1.16
TDS	mg/L	228	217
Se	mg/L	0.005	0.004

Overall, the mean concentration of U has shown a decreasing trend since 1990. A historical summary of U, ^{226}Ra, TDS and Se annual average concentrations for station TL-3 are presented in Figures 4.3.21 to 4.3 24.

TL-4

TL-4 is located within Fulton Creek drainage downstream of TL-3 and at the discharge of Marie Reservoir. Results from the 2008 and 2009-10 sampling period are detailed in the table below.

Parameter	Units	2008 Average Concentration	2009-10 Average Concentration
U	mg/L	0.32	0.35
^{226}Ra	Bq/L	1.43	1.61
TDS	mg/L	226	227
Se	mg/L	0.004	0.003

The average U and TDS concentrations recorded during 2009-10 remained consistent with the values reported in 2008, while the concentration of ^{226}Ra was slightly elevated in comparison to the 2008 value. Overall, mean annual concentrations of U and Se have shown a decreasing trend since 1990.

A historical summary of U, ^{226}Ra, TDS and Se annual average concentrations for station TL-4 are presented in Figures 4.3.25 to 4.3.28.

TL-6

TL-6 is located at the discharge of Minewater Reservoir and generally exhibits ephemeral flows. Because of these flows, only three samples were collected during the reporting period. Results from the 2008 and 2009-10 sampling periods are shown below.

Parameter	Units	2008 Average Concentration	2009-10 Average Concentration
U	mg/L	0.27	0.21
^{226}Ra	Bq/L	6.20	5.57
TDS	mg/L	516	527
Se	mg/L	0.002	0.002

Annual average ^{226}Ra concentrations at TL-6 have fluctuated significantly over the past fifteen years ranging from 1.3 Bq/L in 1996 to 6.4 Bq/L in 2009. Over the same time period concentrations of sulphate have been decreasing while barium has demonstrated a trend similar to that observed in ^{226}Ra. Cameco has concluded this is a result of dissolution of the barium-radium-sulphate precipitate that was generated during the active treatment of mine water with barium chloride during operations.

A historical summary of U, ^{226}Ra, TDS and Se annual average concentrations for station TL-6 are presented in Figures 4.3.29 to 4.3.32.

TL-7

TL-7 is located at the discharge of Meadow Fen. It is one of the four stations identified in the Eldorado decommissioning document (Eldorado 1982) at which COOs are applied. During the 2009-10 reporting period, TDS was the only parameter to meet the COOs established for this station. Results from the 2008 and 2009-10 monitoring period are shown below.

Parameter	Units	2008 Average Concentration	2009-10 Average Concentration	Close Out Objective
U	mg/L	0.31	0.33	0.25
^{226}Ra	Bq/L	1.71	1.31	0.11
TDS	mg/L	250	231	250
Se	mg/L	0.004	0.003	-

Original predictions in SENES 1983 indicated that U concentrations were expected to meet the COOs in the long-term (more than 200 years), while TDS and ^{226}Ra were not expected to meet COOs at any point in the foreseeable future.

While the mean concentration of U during the 2009-10 reporting period was 0.33 mg/L, the concentrations of U recorded in May (0.18 mg/L) and June (0.23 mg/L) 2010 were below the COO. Similar to TL-3, TL-4 and TL-6; mean annual U concentrations have shown an overall decreasing trend since 1990.

Selenium concentrations at TL-7 have continued to follow the overall decreasing trend observed since 1990, with the value recorded in September 2009 (0.0015 mg/L) the lowest value recorded at this station since 1994.

A historical summary of U, ^{226}Ra, TDS and Se annual average concentrations for station TL-7 are presented in Figures 4.3.33 to 4.3.36.

TL-9

TL-9 is located downstream of Greer Lake immediately before the water enters Beaverlodge Lake. Sampling at this station began in 1981 and continued until 1985 at which time it was discontinued. Sampling resumed in 1990 in order to re-assess the water quality entering Beaverlodge Lake. Mean concentrations from the 2008 and 2009-10 reporting periods are detailed in the table below.

Parameter	Units	2008 Average Concentration	2009-10 Average Concentration
U	mg/L	0.31	0.36
^{226}Ra	Bq/L	1.86	1.71
TDS	mg/L	212	250
Se	mg/L	0.004	0.004

The annual average TDS value (250 mg/L) is slightly elevated in comparison to the previous year (212 mg/L); however, it remains below COO established for TL-7. The mean annual U concentration during the 2009-10 reporting period was also slightly elevated in comparison to the 2008 value.

^{226}Ra concentrations have displayed some fluctuation throughout the past twenty years, however, mean annual concentrations of ^{226}Ra have decreased in comparison to the previous year, with values recorded in January (0.48 Bq/L), February (0.48 Bq/L) and May (0.66 Bq/L) 2010 the three lowest values recorded at this station since 2000.

Routine monitoring of Se values at TL-9 were not conducted until 1996 at which time it was identified as a contaminant of concern. Se values measured in 2009-10 (0.004 mg/L) have remained relatively stable over the past five years, however, they are lower than those recorded during the initial monitoring in 1996 (0.010 mg/L).

A historical summary of U, ^{226}Ra, TDS and Se annual average concentrations for station TL-9 are presented in Figures 4.3.37 to 4.3.40.

4.3.3 Other Transition Phase Monitoring Stations (BL-3, BL-4, and AN-4)

BL-3

BL-3 is located in Beaverlodge Lake, approximately 100 m from the Fulton Creek discharge (TL-9). Sampling at this station was originally carried out during the operational mining and milling phase in order to monitor the "near field" impacts of operations on Beaverlodge Lake.

Collection of samples at this location recommenced during the 1998-99 reporting period, and has continued since that time. Sampling frequency increased from semi-annual to quarterly in 2004-05 in order to better assess the conditions in Beaverlodge Lake. Mean annual concentrations recorded during 2008 and the 2009-10 reporting period are shown below.

Parameter	Units	2008 Average Concentration	2009-10 Average Concentration
U	mg/L	0.15	0.15
^{226}Ra	Bq/L	0.05	0.06
TDS	mg/L	150	151
Se	mg/L	0.003	0.003

The annual average concentrations for parameters at this location have remained relatively consistent from 1998 to June 2010.

A historical summary of U, ^{226}Ra, TDS and Se annual average concentrations for station BL-3 are presented in Figures 4.3.41 to 4.3.44.

BL-4

Station BL-4 is located in the approximate center of the north end of Beaverlodge Lake. The sampling frequency was increased from semi-annual to quarterly in 2004-05 in order to better reflect any potential changes or trends. Results from the 2008 and 2009-10 reporting periods are shown in the table below.

Parameter	Units	2008 Average Concentration	2009-10 Average Concentration
U	mg/L	0.14	0.15
^{226}Ra	Bq/L	0.03	0.03
TDS	mg/L	143	145
Se	mg/L	0.003	0.003

Annual average concentrations for U, ^{226}Ra, TDS and Se during the 2009-10 reporting period were generally consistent with previously reported results. Overall, U values at BL-4 appear to be following a downward trend when comparing the data from the previous 24 years.

Historical sampling results are presented in Figures 4.3.45 to 4.3.48.

AN-4

Station AN-4 is located on Martin Lake which receives water that flows out of Beaverlodge Lake and flows into Cinch Lake. In March of 2010, Se was added to the water sampling program at Beaverlodge. At the time of writing one sample had been collected, with a Se value of 0.0004 mg/L. The results of the other parameters of concern from 2008 and 2009-10 are presented below.

Parameter	Units	2008 Average Concentration	2009-10 Average Concentration
U	mg/L	0.08	0.06
^{226}Ra	Bq/L	0.01	0.01
TDS	mg/L	119	109
Se	mg/L	-	0.0004

Concentrations of U at AN-4 have been decreasing over the past several years, with the March 2010 value of 0.06 mg/L the lowest reported value since decommissioning. The annual average concentrations of ^{226}Ra, TDS and Se remain consistent to what has been reported previously.

A historical summary for station AN-4 is presented in Figures 4.3.49 to 4.3.51.

4.4 Hydrology

4.4.1 Introduction

MacLaren Plansearch initially estimated the stream flows for various locations within the Ace Creek and Fulton Creek drainage basins in 1983 (MacLaren Plansearch 1983) as part of the Eldorado Resources Ltd. decommissioning documentation. During the 1996/97 reporting period revisions were made to both the Ace Creek and Fulton Creek stream flow estimates using 10 years of actual flow.

A review of post closure monitoring was conducted using data from 1983 to 1996, and found confirming that the 1983 estimates were low. An additional re-assessment of the hydrology in the Beaverlodge area was subsequently conducted as part of the *Current Period Environmental Assessment* (Connor Pacific 1999).

In summary, the original (1983) stream flow for the predicted shut down and reclamation scenarios (SENES 1983) were:

- AC-14 - 150 L/s
- TL-7 - 7.5 L/s

The revised (TAEM 1997) stream flow predictions were:

- AC-14 - 426 L/s
- TL-7 - 16 L/s

Table 4.1.2 summarizes the original (1983) loading calculations and compares them to the revised loadings, which were derived using the revised (1998) stream flow data.

4.4.2 Hydrological Data and Loading Calculations

Golder Associates Limited (Golder) was retained by Cameco to complete an assessment of the stage and flow data for stream flow monitoring stations at Fulton Creek (TL-7) and Ace Creek (AC-8) for the period January 1, 2009 to June 30, 2010.

During the 2009 calendar year total precipitation for 2009 was below average at the Uranium City station, and above average at the Stony Rapids station. However, on a monthly scale, both stations were well above and below normal throughout the year. Stony Rapids received above average precipitation in February-September (with the exception of May), while Uranium City received near or below average precipitation for every month except June; June received almost twice as much precipitation as normal (Golder 2010).

Precipitation was below normal from January-June, 2010 at the Uranium City station and from February-June, 2010 at the Stony Rapids station. Precipitation was particularly low during February and March 2010 at the Uranium City station, with only 15% and 2% of the historical average respectively.

During 2009 mean discharge values at AC-8 were near the historical mean from January to June, with the spring peak occurring in May. Due to the extreme rainfall in June of 2009, July 2009 discharge reached a record value for the month and was greater than the spring peak. Discharge returned to near normal for September to December of 2009.

Although precipitation was well below normal for winter 2010, discharge at AC-8 was above the historical mean for January – May 2010. The spring peak occurred in May, however, both May and June had discharges lower than the historical mean.

Similar to AC-8, stream discharge at TL-7 was near normal during winter and early spring of 2009. The spring peak occurred in May, however it was less than the historical mean. As observed with AC-8, a second, larger and above normal peak occurred in July of 2009 after which discharge values fell below normal for the remainder of the year. From January to June 2010, mean dischargers were below the historical average, with the spring peak occurring in May.

Loading Calculations

Using the monthly water quality monitoring data for AC-14 and TL-7 along with the corresponding stream flow data for Ace Creek and Fulton Creek the total loading of U, ^{226}Ra, Se and TDS can be calculated. The total loading to Beaverlodge Lake can then be calculated by adding both Ace Creek and Fulton Creek loadings, for each parameter.

Tables 4.4.1 and 4.4.2 present a summary of the monthly loading calculations for U, ^{226}Ra and TDS at TL-7 and AC-14, respectively, as well as the annual loading calculations for Se.

Table 4.4.3 provides a comparison of the 2009-10 actual loadings at each of the two stations and the site total, to the loadings predicted in 1983 and the revised predictions from 1997 for various reclamation scenarios.

Generally the actual loadings tend to be larger than those predicted in 1983 for two reasons:

- 1983 predicted loadings for each of the two scenarios are for the long-term: and
- the actual stream flow rates used to calculate the current loadings are higher than those used in the original 1983 stream flow modeling conducted by MacLaren Plansearch in 1983.

The annual mean discharges as reported in the Golder annual streamflow assessment of the stage and flow data for stream flow monitoring stations at TL-7 and AC-8 for the period from 1980 to December 2009 are:

- AC-14 - 479 L/s
- TL-7 - 18.0 L/s

The original stream flow rates that were used by MacLaren Plansearch (1983) to calculate the operational, shutdown and predicted short- and long-term reclamation loadings are presented in Table 4.4.3. However, as discussed, these flows are not representatives of the actual flows at either station. In the interest of completeness Table 4.4.3 also compares those values to recent actual loadings.

As the revised (1997) stream flow predications better reflect the actual flows in both Ace Creek (AC-14) and Fulton Creek (TL-7), these values were used to recalculate the predicted operational, shutdown and predicted short- and long-term reclamation loadings and the results are presented alongside the original predictions in Table 4.4.3. Table 4.4.3 presents the actual 2009-10 loadings to allow comparison to the recalculated predicted operational, shutdown and predicted short- and long-term reclamation loadings.

A break down of the annual loadings at stations AC-14 and TL-7 is provided in Table 4.4.3. As shown in the table, the total annual loadings of U, ^{226}Ra and TDS at stations AC-14 and TL-7 were less than the revised operational loadings.

Loadings Summary

Table 4.4.3 provides a summary of the total 2009 and 2010 loadings to Beaverlodge Lake ,as well as those of AC-14 and TL-7. Figures 4.4.1 to 4.4.3 present the revised total loadings to Beaverlodge Lake during operations for comparison. As can be seen, the total actual loadings to Beaverlodge Lake are less than the revised operational loadings.

As the second of the COOs states that "*annual radioactive and non-radioactive contaminant loadings to the environment would not be greater after close-out than those which occurred during operations*" a review of this data shows the COOs for total loadings of U, ^{226}Ra and TDS to Beaverlodge Lake have been met during the 2009 monitoring period.

4.5 Air Quality

Section 4.5 presents a summary of the results of historic and on-going radon monitoring at ten separate locations in and around the mill site, various satellite areas and at Uranium City.

4.5.1 Ambient Radon Monitoring

As part of the transitional phase ongoing monitoring program, radon levels have been monitored on and around the Beaverlodge mine and mill site and at other locations in the region since 1985. The sampling regime uses Terrace, track-etch type radon gas monitors (Tech/Ops Landauer Inc. Glenwood, Illinois). Monitors are collected and replaced semi-annually in the spring and fall of each year from ten stations established throughout the area.

The ten radon monitoring stations are illustrated in Figure 4.5.1 and are located in the following areas:

- Airport Beacon;
- Eldorado town site;
- Northwest of the Airport;
- Ace Creek;
- Fay Waste Rock;
- Fookes Delta;
- Marie Lake Delta;
- Donaldson Lake;
- Fredette Lake; and
- Uranium City.

At the cessation of mining in 1982, track-etch detectors were placed 1 m above the ground at 84 separate locations throughout the Beaverlodge area. The track-etch cups were exposed during two separate periods (May to September, 1982 and October to December, 1982) in order to ascertain the radon concentrations during operations.

Track-etch cups were set out at ten stations in the Beaverlodge area from July 2, 2009 to February 5, 2010. Following sample retrieval, additional track-etch cups were set out from February 8 to May 28, 2010; however, data was unavailable at the time of writing. Table 4.5.1 presents a summary of the radon monitoring conducted at the ten sites for the 2009-10 monitoring period and compares it to the previous two years data. Although the entire suite of stations monitored in 1982 is not applicable for comparison to the current monitoring results, applicable stations have been included in the summary.

As the second of the COOs states that *"annual radioactive and non-radioactive contaminant loadings to the environment would not be greater after close-out than those which occurred during operations*" it is clear from a review of this data that the COO for radon has been consistently met since operations ceased.

4.6 2009-10 Piezometric Data

During the 2009-10 reporting period Urdel Ltd. from Uranium City monitored the nine pneumatic piezometers on the Fookes Delta on behalf of Cameco.

Cameco retained the services of SRK Consulting (Canada) Inc. (SRK) to conduct a review of the piezometer data from the Fookes Lake tailings delta for the period between January 2009 and December 2009 (SRK 2010).

Excluding higher-than-normal levels that were measured in P93-1 (June 2009) and P93-9 (April 2009), the variations in the piezometric levels from January 2009 to June 2010 were generally similar to what has been observed since 1997. As expected, the trends in the 2010 data were consistent with the typical data since 1997.

The piezometric levels are above the cover in some areas for portions of the year. This was assumed to be the case as part of cover design and is the basis for the cover installation. In particular, the filter cover was designed to dissipate this increase in pressure and concurrently prevent the potential movement of tailings to the surface. Evidence from previous site inspections by SRK, including the most recent inspection in late May 2010, confirms the cover is fulfilling these objectives.

4.7 Three Year Inspection of Fookes Reservoir Delta and Outlet Structures

On May 27, 2010 an inspection of the cover at the Fookes Reservoir tailings delta and the two outlet spillways at Marie and Fookes Reservoirs were conducted by representatives of SRK consulting. Previous inspections of these facilities were undertaken by SRK in September 1998, September 2001, June 2004 and August 2007.

It was found during the May 2010 inspection that no new boils or significant erosion features were observed on the Fookes Reservoir tailings delta. Piezometric data confirms that since 1997, piezometric levels have been quite consistent in terms of annual and seasonal trends.

SECTION 5

2010 WORK PLAN

5.0 2010 WORK PLAN

As this report was prepared in June 2010, this section describes those tasks proposed for the remainder of the year. A detailed list of studies and activities conducted from January 1st, 2010 to June 30th, 2010 is presented in Section 3.0.

5.1 Regular Scheduled Monitoring

Representatives of Cameco continue to complete the established monitoring program associated with the various properties. A revised water sampling program (WSP) is to be submitted for approval in the second half of 2010. The new WSP will take into consideration the vast amount of data available for the Beaverlodge site, previously approved and implemented sampling programs, and the role of monitoring as a part of the transition phase. The proposed program will attempt to streamline monitoring to better characterize water quality, reduce overall costs and maintain quality control.

5.2 JRG Inspections/Public Meetings/EQC

The next scheduled quarterly JRG meeting will take place in Saskatoon on July 26, 2010.

A public meeting is tentatively scheduled for October 2010 that will provide an activity update for the Beaverlodge sites. Following the meeting EQC members will be provided a tour of the properties discussing the activities that are ongoing and any concerns they may have.

5.3 Studies

Cameco has initiated or proposed a number of studies in 2010 that are aimed at furthering our understanding of the impacts and interaction of the licensed properties with the environment.

Continuing Studies

- *Monitoring of packed borehole closure*
- *Ace Lake watershed characterization*

New Studies

Country Foods Assessment

A study to better understand the wildlife utilization and potential implications to human health from traditional harvesting is currently underway. The information gathered will be used to further develop and validate current ecological and human health risk models for the region, while traditional food harvesting results will be shared with the residents of Uranium City.

Small Site Assessment

Cameco is working with the JRG to determine the property boundaries of numerous “small sites” associated with the large group of properties referred to as the Main Mine/Mill Facilities.

These “small sites” are areas that potentially have limited environmental and/or health and safety risks and may be good candidates for release from decommissioning and reclamation, exemption from CNSC licensing and accepted into the provincial IC program.

5.4 2010-11 Work Plan

During the 2010-11 reporting period a number of activities are planned for the Beaverlodge mine/mill area and associated properties. In support of the management framework established for the Beaverlodge properties, future works conducted on the licenced properties will support the management of human and environmental risks to acceptable levels, while demonstrating conditions on the properties are stable and/or improving.

Ultimately, the properties are being managed for acceptance into the provincial IC program, and future works undertaken will support the management framework established to move towards this goal.

SECTION 6

REFERENCES

6.0 REFERENCES

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TABLES

TABLES

Table 4.1.1
Summary of Applicable Water Quality Objectives

Parameter	Units	Close Out Objectives[1]	SWQO For the Protection of Aquatic Life[2]	Canadian Water Quality Guidelines for the Protection of Aquatic Life[3]	Saskatchewan Municipal Drinking Water Quality Objectives[4]	Guidelines for Canadian Drinking Water Quality[5]
Ammonia, Total	mg/L	-	-	1.37 at pH 8.0:10°C 2.20 at pH 6.5:10°C	-	-
Arsenic	mg/L	0.01	0.005	0.005	0.025	0.01
Barium	mg/L	-		-	1	1
Cadmium	mg/L	-	0.017 at [$CaCO_3$]=0-48.5 µg/L 0.032 at [$CaCO_3$]=48.5-97 µg/L 0.058 at [$CaCO_3$]= 97-194 µg/L 0.10 at [CaCo3] >194 µg/L	$10^{\{.86[log(hardness)]-3.2\}}$	0.005	0.005
Chromium	mg/L	-	0.001 (Cr VI)	Cr(III) 0.0089 Cr(VI) 0.001	0.05	0.05
Copper	mg/L	0.02	0.002 at [$CaCO_3$]=0-120 mg/L 0.003 at [$CaCO_3$]=120-180 mg/L 0.004 at [$CaCO_3$] >180 mg/L	0.002 at [$CaCO_3$]=0-120 mg/L 0.003 at [$CaCO_3$]=120-180 mg/L 0.004 at [$CaCO_3$] >180 mg/L	1	1
Iron	mg/L	0.3	0.3	0.3	0.3	0.3
Lead	mg/L	0.05	0.001 at [$CaCO_3$]=0-60 mg/L 0.002 at [$CaCO_3$]=60-120 mg/L 0.004 at [$CaCO_3$]=120-180 mg/L 0.007 at [$CaCO_3$] >180 mg/L	0.001 at [$CaCO_3$]=0-60 mg/L 0.002 at [$CaCO_3$]=60-120 mg/L 0.004 at [$CaCO_3$]=120-180 mg/L 0.007 at [$CaCO_3$] >180 mg/L	0.01	0.01
Mercury	mg/L	-	0.000026	0.000026	0.001	0.001
Nickel	mg/L	-	0.025 at [$CaCO_3$]=0-60 mg/L 0.065 at [$CaCO_3$]=60-120 mg/L 0.110 at [$CaCO_3$]=120-180 mg/L 0.150 at [$CaCO_3$] >180 mg/L	0.025 at [$CaCO_3$]=0-60 mg/L 0.065 at [$CaCO_3$]=60-120 mg/L 0.110 at [$CaCO_3$]=120-180 mg/L 0.150 at [$CaCO_3$] >180 mg/L	-	-
pH	-	6.5 – 9.5	-	6.5 – 9.0	6.5 – 9.0	6.5 – 8.5
Radium 226	Bq/L	0.11	-	-	-	-
Selenium	mg/L	-	0.001	0.001	0.01	0.01
Silver	mg/L	-	0.0001	0.0001	-	-
TDS	mg/L	250	-	-	1500	500
TSS	mg/L	BkGd + 10	-	-	-	-
Uranium	mg/L	0.25	0.015	-	0.02 (Amended 2002)	0.02
Zinc	mg/L	0.05	0.03	0.03	5	5

1 Close Out Objectives, Atomic Energy Control Board, 1982
2 Saskatchewan Surface Water Quality Objectives for the Protection of Aquatic Life, Interim Edition, 2006.
3 Canadian Water Quality Guidelines for the Protection of Aquatic Life, CCME, 2006
4 Saskatchewan Drinking Water Quality Standards and Objectives EPB207/2002, 2002.
5 Guidelines for Canadian Drinking Water Quality, Health Canada, 2007.

Table 4.1.2
Predicted Loadings to Beaverlodge Lake During Operations

Parameter		Total Loadings	
		1983 Estimate	Revised Estimate (1998)
Uranium	(kg/year)	12,000	16,000
Total Dissolved Solids	(kg/year)	5,000,000	6,240,000
^{226}Radium	(Bq/year)	1.74×10^8	27.3×10^8

Table 4.3.1
Annual Means for Uranium (µg/L)

Year	Station																									
	AC-14		AC-8		AN-3		AN-4		AN-5		BL-3		BL-4		DB-6		TL-3		TL-4		TL-6		TL-7		TL-9	
	Mean (µg/L)	n	Mean (µg/L)	n	Mean (µg/L)	n	Mean (µg/L)	n	Mean (µg/L)	n	Mean (µg/L)	n	Mean (µg/L)	n	Mean (µg/L)	n	Mean (µg/L)	n	Mean (µg/L)	n	Mean (µg/L)	n	Mean (µg/L)	n	Mean (µg/L)	n
1982	458.3	28	19.0	4	13.1	16	142.0	2	-	-	1290.4	5	174.8	4	1352.0	7	4236.5	40	3829.2	39	7039.2	25	4016.5	93	4044.5	32
1983	67.6	44	26.0	13	3.9	1	-	-	1060.7	9	-	-	209.0	1	1300.4	11	4278.8	26	3654.0	28	5523.1	13	3802.8	71	3090.0	5
1984	46.0	47	25.8	11	1.5	1	93.0	1	686.3	8	-	-	-	-	1077.3	11	3875.0	12	4171.1	19	3100.0	6	2973.9	46	2410.0	5
1985	35.0	34	25.6	5	1.6	2	56.0	1	811.7	3	-	-	210.0	2	975.0	4	3220.0	5	3027.8	9	5575.0	2	2495.2	20	2100.0	1
1986	34.1	9	20.5	2	0.8	1	56.0	1	780.5	2	-	-	178.0	1	790.0	2	2725.0	2	3083.3	6	5000.0	1	2473.8	8	-	-
1987	60.1	7	28.0	2	0.5	1	120.0	1	655.0	2	-	-	215.0	1	1050.0	2	3225.0	2	3016.0	5	2250.0	2	2197.6	7	-	-
1988	37.4	10	25.0	2	2.1	1	70.0	1	722.0	3	-	-	157.0	1	245.0	3	1632.5	2	1726.8	6	3525.0	2	2807.8	9	-	-
1989	43.3	9	15.8	2	1.2	1	86.0	1	547.5	2	-	-	212.0	1	579.5	2	1725.0	2	2266.7	9	3190.0	1	2007.8	9	-	-
1990	55.0	9	14.9	4	114.0	1	188.0	1	209.7	3	-	-	174.0	1	441.7	3	1789.0	3	2051.1	7	1850.0	1	2105.9	9	1024.7	3
1991	25.2	9	22.5	2	1.3	1	52.0	1	476.0	2	-	-	201.0	1	446.5	2	2126.7	3	2081.7	6	1950.0	1	2044.3	7	1290.0	3
1992	22.6	7	18.5	2	1.0	1	76.0	1	217.0	2	-	-	177.0	1	328.5	2	1460.0	2	1445.0	6	2020.0	1	1433.3	7	1045.5	4
1993	34.2	6	26.0	2	1.9	1	93.0	1	287.5	2	-	-	182.0	1	711.5	2	1530.0	3	1605.0	6	1460.0	1	1489.7	6	1497.5	8
1994	50.2	9	18.0	3	2.0	1	82.0	1	135.0	3	-	-	181.0	1	477.7	3	1228.6	10	1267.3	9	969.0	1	992.2	10	1173.6	10
1995	28.6	8	14.5	2	4.0	1	71.0	1	155.5	2	-	-	158.0	1	287.5	2	1194.3	8	1218.6	8	1435.0	2	1194.8	9	1174.4	10
1996	29.4	10	15.0	1	0.7	1	74.0	1	212.0	2	-	-	173.0	1	349.5	2	1023.0	5	1197.3	6	612.0	1	1164.0	11	1252.5	8
1997	27.8	8	16.0	4	1.5	1	40.0	1	151.3	4	-	-	178.5	2	384.0	4	1023.1	9	1015.2	10	778.0	2	1340.1	11	964.3	11
1998	39.6	12	14.0	4	1.5	1	97.0	1	213.2	6	153.0	1	152.5	2	309.3	6	756.6	12	783.0	12	447.0	2	701.9	11	711.3	11
1999	62.8	12	15.8	4	1.5	1	84.0	1	325.5	6	167.5	2	151.5	2	412.2	6	787.4	11	750.0	12	748.0	1	667.9	13	606.8	12
2000	51.2	12	15.5	4	1.4	1	99.0	1	225.7	7	163.0	2	153.0	2	516.2	6	697.4	12	626.0	12	659.5	2	650.6	12	468.0	11
2001	36.9	12	20.8	4	4.5	1	87.0	1	323.8	6	170.5	2	167.0	2	436.0	6	614.6	12	629.1	12	580.0	1	612.3	12	588.9	12
2002	30.3	12	17.5	4	1.2	1	68.0	1	429.0	6	164.0	1	164.3	4	314.1	7	607.3	12	577.8	12	353.5	2	578.8	12	554.0	11
2003	29.6	11	16.5	4	1.8	1	82.0	1	388.3	6	179.5	2	162.0	2	287.5	4	608.8	12	550.9	12	385.0	2	545.0	12	707.0	11
2004	37.2	13	15.2	5	1.3	1	71.0	1	363.8	6	150.0	2	135.0	2	354.7	6	552.3	12	535.8	12	177.5	2	530.0	12	481.8	11
2005	38.8	14	14.0	4	1.6	1	83.0	1	349.2	5	160.0	4	166.7	3	243.8	5	501.7	12	463.3	12	320.0	2	581.8	11	398.5	13
2006	41.4	13	17.8	4	1.4	1	92.0	1	241.2	5	162.5	4	150.0	4	230.8	4	373.3	11	381.8	11	280.0	1	375.5	11	384.2	12
2007	40.7	12	16.0	4	1.5	1	75.0	1	277.0	6	146.0	4	142.0	4	307.4	5	408.8	12	382.4	12	No water	0	374.3	12	316.9	12
2008	27.6	12	18.3	4	2.0	1	75.0	1	294.5	6	146.5	4	140.5	4	280.0	4	423.3	12	324.3	12	273.0	1	313.8	12	311.9	10
2009	23.8	13	14.6	5	1.6	1	63.0	1	109.0	4	152.0	4	143.8	4	215.5	6	393.9	12	344.5	11	210.0	2	327.5	11	296.4	8
2010	19.5	6	13.0	2	-	-	15.0	1	183.0	3	143.0	2	142.0	2	234.5	2	341.8	5	356.2	5	248.0	1	318.5	6	483.8	4

Table 4.3.2
Annual Means for Radium-226 (Bq/L)

	Station																									
	AC-14		AC-8		AN-3		AN-4		AN-5		BL-3		BL-4		DB-6		TL-3		TL-4		TL-6		TL-7		TL-9	
Year	Mean (Bq/L)	n	Mean (Bq/L)	n	Mean (Bq/L)	n	Mean (Bq/L)	n	Mean (Bq/L)	n	Mean (Bq/L)	n	Mean (Bq/L)	n	Mean (Bq/L)	n	Mean (Bq/L)	n	Mean (Bq/L)	n	Mean (Bq/L)	n	Mean (Bq/L)	n	Mean (Bq/L)	n
1982	0.313	28	0.028	4	0.006	16	0.215	2	-	-	0.155	6	0.057	4	0.088	7	4.293	40	0.945	40	0.326	26	0.259	92	0.093	31
1983	0.141	43	0.022	13	0.040	1	-	-	0.358	9	-	-	0.080	1	0.059	11	1.502	26	0.762	28	13.315	13	0.204	74	0.134	5
1984	0.145	46	0.025	11	0.005	1	0.020	1	0.377	8	-	-	-	-	0.085	11	0.678	12	3.105	19	0.840	6	0.591	46	0.184	5
1985	0.148	34	0.022	5	0.005	2	0.010	1	0.433	3	-	-	0.070	2	0.063	4	0.800	5	1.228	9	1.450	2	0.694	20	0.300	1
1986	0.114	9	0.025	2	0.005	1	0.020	1	0.450	2	-	-	0.050	1	0.035	2	0.550	2	1.367	6	1.600	1	0.430	8	-	-
1987	0.133	7	0.035	2	0.005	1	0.010	1	0.475	2	-	-	0.040	1	0.055	2	0.625	2	1.180	5	1.225	2	0.686	7	-	-
1988	0.146	10	0.030	2	0.005	1	0.005	1	0.433	3	-	-	0.080	1	0.037	3	0.340	2	0.992	6	1.300	2	0.572	9	-	-
1989	0.137	9	0.025	2	0.005	1	0.005	1	0.475	2	-	-	0.030	1	0.040	2	0.450	2	1.222	9	1.800	1	0.668	9	-	-
1990	0.101	9	0.036	4	0.005	1	0.005	1	0.550	3	-	-	0.005	1	0.023	3	0.533	3	1.043	7	1.300	1	0.627	9	0.217	3
1991	0.062	9	0.020	2	0.005	1	0.005	1	0.475	2	-	-	0.040	1	0.035	2	0.650	3	1.258	6	1.300	1	0.876	7	1.067	3
1992	0.047	7	0.020	2	0.010	1	0.010	1	0.450	2	-	-	0.030	1	0.045	2	0.625	2	1.042	6	1.200	1	0.814	7	1.575	4
1993	0.070	6	0.090	2	0.010	1	0.020	1	0.455	2	-	-	0.030	1	0.055	2	0.683	3	1.258	6	1.200	1	1.033	6	1.250	8
1994	0.087	9	0.027	3	0.005	1	0.010	1	0.940	3	-	-	0.040	1	0.080	3	0.673	10	1.083	9	1.600	1	0.890	10	0.900	10
1995	0.069	8	0.020	2	0.005	1	0.010	1	0.525	2	-	-	0.040	1	0.045	2	0.688	8	1.375	8	1.500	2	1.094	9	1.185	10
1996	0.061	11	0.030	1	0.005	1	0.010	1	0.935	2	-	-	0.020	1	0.040	2	0.640	5	1.283	6	1.300	1	1.000	11	0.937	8
1997	0.060	8	0.025	4	0.008	1	0.009	1	0.595	4	-	-	0.035	2	0.048	4	0.659	9	1.137	10	1.950	2	1.259	11	0.955	11
1998	0.083	12	0.023	4	0.005	1	0.010	1	0.658	6	0.040	1	0.030	2	0.040	6	0.603	12	0.990	12	2.700	2	0.943	11	1.193	11
1999	0.089	12	0.020	4	0.005	1	0.010	1	0.787	6	0.050	2	0.035	2	0.048	6	0.795	11	1.065	12	3.900	1	0.931	13	1.203	12
2000	0.079	13	0.020	4	0.005	1	0.050	1	0.627	7	0.035	2	0.025	2	0.057	6	0.818	12	1.073	12	4.150	2	0.822	12	0.911	11
2001	0.056	12	0.015	4	0.005	1	0.005	1	0.672	6	0.045	2	0.030	2	0.043	6	0.840	12	1.013	12	5.300	1	0.978	12	1.399	12
2002	0.050	12	0.018	4	0.005	1	0.030	1	0.625	6	0.050	1	0.048	4	0.039	7	0.865	12	1.244	12	4.250	2	1.078	11	1.636	11
2003	0.055	11	0.018	4	0.005	1	0.006	1	0.972	6	0.100	2	0.025	2	0.033	4	0.918	12	1.273	12	4.950	2	1.225	12	1.636	11
2004	0.060	13	0.020	5	0.005	1	0.009	1	0.753	6	0.075	2	0.035	2	0.038	6	1.008	12	1.417	12	4.150	2	1.357	12	1.709	11
2005	0.061	14	0.020	4	0.005	1	0.005	1	0.626	5	0.060	4	0.037	3	0.042	5	1.040	12	1.390	12	5.200	2	1.088	11	1.885	13
2006	0.052	13	0.011	4	0.005	1	0.005	1	0.692	5	0.050	4	0.033	4	0.044	4	0.905	11	1.260	11	6.300	1	1.191	11	1.658	12
2007	0.052	12	0.014	4	0.005	1	0.008	1	0.695	6	0.033	4	0.033	4	0.040	5	1.107	12	1.332	12	No water	0	1.249	12	1.858	12
2008	0.048	12	0.014	4	0.005	1	0.006	1	1.015	6	0.052	4	0.025	4	0.037	4	1.122	12	1.433	12	6.200	1	1.719	12	1.860	10
2009	0.034	13	0.014	5	0.005	1	0.009	1	0.762	4	0.053	4	0.025	4	0.035	6	1.198	12	1.582	11	5.550	2	1.273	11	2.075	8
2010	0.032	6	0.014	2	-	-	0.010	1	1.443	3	0.050	2	0.040	2	0.030	2	1.070	5	1.660	5	5.600	1	1.548	6	0.980	4

Table 4.3.3
Annual Means for TDS (mg/L)

Year	Station																							
	AC-14		AC-8		AN-3		AN-4		AN-5		BL-3		BL-4		DB-6		TL-3		TL-4		TL-6		TL-7	TL-9
	Mean (mg/L)	n	Mean (mg/L)	n	Mean (mg/L)	n	Mean (mg/L)	n	Mean (mg/L)	n	Mean (mg/L)	n	Mean (mg/L)	n	Mean (mg/L)	n	Mean (mg/L)	n	Mean (mg/L)	n	Mean (mg/L)	n	Mean (mg/L)	n
1982	-	-	-	-	114.5	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	438.3	3
1983	85.3	25	78.7	6	104.0	1	-	-	302.5	6	-	-	-	-	219.3	7	964.0	4	879.7	13	4286.7	3	966.0	25
1984	88.5	47	79.8	11	110.0	1	138.0	1	232.6	8	188.0	1	202.0	1	202.8	10	857.5	12	970.1	19	3686.7	6	1593.6	46
1985	76.7	34	66.2	5	113.0	2	94.0	1	221.7	3	-	-	143.0	2	179.5	4	708.6	5	734.3	9	2475.0	2	1053.3	20
1986	79.9	9	65.0	2	94.0	1	103.0	1	215.5	2	-	-	180.0	1	159.5	2	632.0	2	792.0	6	3180.0	1	1314.6	8
1987	80.1	7	72.0	2	84.0	1	113.0	1	202.5	2	-	-	158.0	1	185.5	2	715.0	2	730.2	5	2630.0	2	904.4	7
1988	75.7	10	81.5	2	102.0	1	109.0	1	242.7	3	-	-	170.0	1	150.7	3	398.0	2	667.2	6	2295.0	2	1023.1	9
1989	77.3	9	72.0	2	96.0	1	126.0	1	208.0	2	-	-	160.0	1	128.5	2	436.5	2	695.5	8	1060.0	1	653.5	8
1990	84.0	5	74.0	2	68.0	1	112.0	1	172.5	2	-	-	132.0	1	124.5	2	210.0	1	627.3	4	1060.0	1	789.3	6
1991	136.8	9	72.0	2	83.0	1	116.0	1	151.0	2	-	-	11.0	1	187.0	2	567.0	3	567.2	6	1290.0	1	555.9	7
1992	77.0	7	84.5	2	90.0	1	120.0	1	168.5	2	-	-	152.0	1	141.0	2	408.5	2	457.7	6	1200.0	1	475.3	7
1993	74.4	9	76.0	2	93.0	1	115.0	1	178.0	2	-	-	142.0	1	148.0	2	433.7	3	475.0	6	872.0	1	513.3	9
1994	77.0	7	73.0	2	83.0	1	118.0	1	135.0	2	-	-	152.0	1	120.0	2	376.1	8	397.5	6	478.0	1	367.7	7
1995	77.9	7	74.0	2	77.0	1	118.0	1	106.5	2	-	-	146.0	1	113.0	2	351.9	7	390.4	7	731.5	2	401.8	8
1996	66.1	11	73.0	2	82.0	1	115.0	1	193.0	2	-	-	146.0	1	146.5	2	310.0	5	372.7	6	272.0	1	458.5	10
1997	65.8	8	68.5	4	92.0	1	127.0	1	132.5	4	-	-	165.5	2	135.5	4	307.2	9	337.5	10	329.0	2	343.1	11
1998	82.1	12	70.5	4	82.0	1	229.0	1	166.5	6	288.0	1	142.5	2	138.5	6	295.0	12	314.4	12	630.5	2	315.7	10
1999	83.5	12	69.5	4	94.0	1	148.0	1	178.7	6	163.0	2	153.0	2	152.7	6	303.9	11	303.1	12	626.0	1	305.9	13
2000	72.9	12	74.8	4	63.0	1	99.0	1	179.1	7	121.5	2	123.5	2	173.3	6	300.4	12	298.0	12	741.0	2	324.8	12
2001	78.7	12	72.0	4	58.0	1	93.0	1	190.8	6	146.0	2	146.5	2	166.8	6	281.3	12	289.9	12	660.0	1	302.8	12
2002	68.8	12	74.3	4	81.0	1	108.0	1	190.5	6	137.0	1	181.5	4	130.4	7	247.3	12	262.4	12	419.0	2	244.9	11
2003	76.6	11	71.5	4	88.0	1	119.0	1	186.8	6	156.5	2	144.5	2	134.3	4	247.0	12	258.3	12	505.5	2	265.4	12
2004	71.2	13	70.8	5	82.0	1	112.0	1	179.5	6	145.0	2	135.0	2	143.8	6	232.6	12	247.5	12	318.0	2	283.7	12
2005	83.5	12	72.0	4	98.0	1	129.0	1	179.5	6	151.5	4	179.7	3	148.0	5	247.6	12	236.8	12	565.5	2	300.4	11
2006	78.9	11	71.3	4	92.0	1	127.0	1	163.4	5	144.0	4	137.5	4	130.8	4	198.3	11	213.0	11	506.0	1	227.6	11
2007	85.2	12	80.0	4	84.0	1	104.0	1	190.3	6	146.5	4	138.8	4	153.4	5	226.3	12	228.7	12	No water	0	242.2	12
2008	71.6	12	63.5	4	94.0	1	119.0	1	185.3	6	149.5	4	143.0	4	153.3	4	228.3	12	225.7	12	516.0	1	249.6	12
2009	73.4	13	73.0	5	89.0	1	105.0	1	136.6	5	151.3	4	142.0	4	150.3	6	220.3	12	227.3	11	526.0	2	222.0	11
2010	79.5	6	79.5	2	-	-	113.0		221.3	3	153.5	2	152.0	2	158.0	2	210.6	5	227.4	5	529.0	1	249.5	6

Table 4.3.4
2009-10 Annual Average versus Close-Out Objectives

Parameter	Unit	AC-14	AN-5	DB-6	TL-7	TL-9[1]	Close-Out Objective
Arsenic	(µg/L)	0.2	0.5	0.1	1.5	1.4	**10**
Barium	(mg/L)	0.023	0.162	0.046	0.232	0.737	**1**
Copper	(mg/L)	0.001	0.001	0.001	0.001	0.001	**0.02**
Iron	(mg/L)	0.062	0.600	0.017	0.157	0.032	**0.3**
Nickel	(mg/L)	0.00024	0.00058	0.00022	0.00065	0.00051	**0.05**
Lead	(mg/L)	0.0004	0.0003	0.0001	0.0006	0.0006	**0.025**
Radium 226	(Bq/L)	0.033	1.054	0.034	1.370	1.710	**0.11**
TDS	(mg/L)	78.53	168.38	152.25	231.71	249.75	**250**
TSS	(mg/L)	1.263	2.500	1.000	1.412	1.333	**BkGd + 10**
Uranium	(µg/L)	22.5	140.7	220.3	324.2	358.8	**250**
Zinc	(mg/L)	0.002	0.002	0.001	0.001	0.001	**0.05**

1-Close-out Objectives were not specified for TL-9, however it is included as it is located at the discharge of the decommissioned tailings management area, immediately before the water enters Beaverlodge Lake.

Table 4.3.5
Operational and Predicted Water Quality Values

Scenario	Ace Creek (AC14)			Meadow Lake (TL7)			Beaverlodge Lake (BL 4)		
	U (mg/L)	^{226}Ra (Bq/L)	TDS (mg/L)	U (mg/L)	^{226}Ra (Bq/L)	TDS (mg/L)	U (mg/L)	^{226}Ra (Bq/L)	TDS (mg/L)
Operation Phase	0.65	0.22	174	4.06	0.44	1793	0.2	0.11	150
Predicted at Shutdown	0.035	0.06	129	3.16	0.53	1130	0.2	0.11	150
Minimum Reclamation (Long Term Predicted)	0.035	0.06	129	0.1	0.38	389	0.03	0.06	128
Maximum Reclamation (Long Term Predicted)	0.03	0.06	125	0.1	0.27	414	0.03	0.06	127

Table 4.3.6
Transition Phase Monitoring – Year 24 (2009)

	AC14	*TL7*	*BL4*	*DB6*	*AN5*	*AC14*	*TL7*	*BL4*	*AC14*	*TL7*	*BL4*	*AC14*	*TL7*	*BL4*
	Close Out Objective Concentration					*Model Concentration Predicted at Shutdown v. Actual Results*			*Predicted Concentrations For Minimum Reclamation v. Actual Results*			*Predicted Concentration for Maximum Reclamation v. Actual Results*		
Parameter	Met	Met	Met	Met	Met	Met	Met	Met	Met	Met	Met	Met	Met	Met
Uranium	**Y**	**N**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**N**	**N**	**Y**	**N**	**N**
^{226}Radium	**Y**	**N**	**Y**	**Y**	**N**	**Y**	**N**	**Y**	**Y**	**N**	**Y**	**Y**	**N**	**Y**
TDS	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**N**	**Y**	**Y**	**N**
Arsenic	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium	**Y**	**Y**	-	**Y**	**Y**	-	-	-	-	-	-	-	-	-
Copper	**Y**	**Y**	**Y**	**Y**	**Y**	-	-	-	-	-	-	-	-	-
Iron	**Y**	**Y**	**Y**	**Y**	**Y**	-	-	-	-	-	-	-	-	-
Lead	**Y**	**Y**	**Y**	**Y**	**Y**	-	-	-	-	-	-	-	-	-
Nickel	**Y**	**Y**	**Y**	**Y**	**Y**	-	-	-	-	-	-	-	-	-
TSS	**Y**	**Y**	**Y**	**Y**	**Y**	-	-	-	-	-	-	-	-	-
Zinc	**Y**	**Y**	**Y**	**Y**	**Y**	-	-	-	-	-	-	-	-	-

Y – Yes
N – No

Table 4.4.1
2009-10 Monthly Loading Calculations at TL-7

Month	Days in Month	Average Flows (L/s)	Uranium (mg/L)	U Loadings (Kg/month)	^{226}Ra (Bq/L)	^{226}Ra Loadings (Bq/month) x 10^7	TDS (mg/L)	TDS Loadings (kg/month) x 10^4	Se (mg/L)	Se Loadings (Kg/year)
January 2009	31	2.9	0.453	3.52	1.0	0.78	246.00	0.19	-	-
February 2009	28	2.2	0.431	2.29	1.3	0.69	238.00	0.13	0.0029	-
March 2009	31	1.5	0.395	1.59	1.5	0.60	259.00	0.10	-	-
April 2009	30	2.1	0.389	2.12	1.4	0.76	228.00	0.12	0.0029	-
May 2009	31	27.7	0.226	16.77	1.1	8.16	157.00	1.16	0.0024	-
June 2009	30	20.4	0.236	12.48	1.3	6.87	218.00	1.15	0.0021	-
July 2009	31	42.2	0.248	28.03	1.3	14.69	209.00	2.36	-	-
August 2009	31	14.6	0.258	10.09	1.3	5.08	219.00	0.86	0.0021	-
September 2009	30	6.9	0.267	4.78	1.3	2.334	212.00	0.38	0.002	-
October 2009	31	6.1	0.338	5.52	1.4	2.29	235.00	0.38	0.0025	-
November 2009	30	6.1	0.361	5.71	1.1	1.74	221.00	0.35	0.0022	-
December 2009[a]	31	-	-	-	-	-	-	-	-	-
January 2010	31	4.1	0.494	5.42	2.2	2.42	291	0.32	0.0039	-
February 2010	28	3.4	0.471	3.87	1.4	1.15	278	0.23	0.0031	-
March 2010	31	2.6	0.384	2.67	0.69	0.48	328	0.23	0.0019	-
April 2010	30	4.6	0.175	2.09	1.1	1.31	144	0.17	0.0017	-
May 2010	31	16.7	0.226	10.11	1.6	7.16	218	0.98	0.0032	-
June 2010	30	6.6	0.16	2.74	2.3	3.93	238	0.41	0.0032	-
Annual Average		**9.79**	**0.324**		**1.37**		**232**		**0.0026**	
Total Loadings				**1.20E+02**		**6.04E+08**		**9.53E+04**		**7.90E-01**

[a] – No flow due to ice-build up in December 2009

Table 4.4.2
2009-10 Monthly Loading Calculations at AC-14

Month	Month	Days in Month	Average Flows (L/s)	Uranium (mg/L)	U Loadings (Kg/month)	^{226}Ra (Bq/L)	^{226}Ra Loadings (Bq/month) x 10^7	TDS (mg/L)	TDS Loadings (kg/month) x 10^4	Se (mg/L)	Se Loadings (Kg/year)
January 2009	January	31	242	0.024	15.56	0.04	2.59	70	4.54	-	-
February 2009	February	28	180	0.022	9.58	0.03	1.31	60	2.61	0.0001	-
March 2009	March	31	124	0.023	7.64	0.05	1.66	92	3.06	-	-
April 2009	April	30	175	0.037	16.78	0.05	2.27	78	3.54	0.0003	-
May 2009	May	31	1066	0.023	65.67	0.02	5.71	87	24.84	0.0003	-
June 2009	June	30	852	0.023	50.79	0.03	6.63	87	19.21	0.0001	-
July 2009	July	31	1478	0.023	91.05	0.02	7.92	75	29.69	-	-
August 2009	August	31	681	0.024	43.78	0.04	7.30	72	13.13	0.0001	-
September 2009	September	30	454	0.025	29.42	0.04	4.71	82	9.65	0.0001	-
October 2009	October	31	432	0.026	30.08	0.04	4.63	80	9.26	0.0002	-
November 2009	November	30	431	0.023	25.69	0.03	3.35	70	7.82	0.0001	-
December 2009	December	31	414	0.014	15.52	0.005	0.55	32	3.55	0.0001	-
January 2010	January	31	341	0.019	17.35	0.02	1.83	77	7.03	0.0001	-
February 2010	February	28	280	0.016	10.84	0.03	2.03	86	5.83	0.0001	-
March 2010	March	31	217	0.016	9.30	0.03	1.74	92	5.35	0.0001	-
April 2010	April	30	309	0.023	18.42	0.03	2.40	62	4.97	0.0001	-
May 2010	May	31	744	0.022	43.84	0.04	7.97	86	17.14	0.0001	-
June 2010	June	30	430	0.021	23.41	0.04	4.46	74	8.25	0.0001	-
Annual Average	**Annual Average**		**491.67**	**0.022**		**0.03**		**76**		**0.0001**	
Total Loadings	**Total Loadings**				**5.25E+02**		**6.91E+08**		**1.79E+06**		**1.55E+00**

Table 4.4.3
Comparison of Original and Revised Predicted Loadings to Actual Loadings

Scenario	Parameter	AC14			TL7			Site Total Loadings
		Average Flows (L/s)	Average Concentration	Actual Loadings	Average Flows (L/s)	Average Concentration	Actual Loadings	
Original Predictions								
During Operations	U (mg/L)	90	0.65	1.84E+03	80.5	4.1	1.04E+04	1.23E+04
	Ra226 (Bq/L)	90	0.22	6.24E+08	80.5	0.44	1.12E+09	1.74E+09
	TDS (mg/L)	90	174	4.94E+05	80.5	1793	4.55E+06	5.05E+06
At Shutdown (Predicted)	U (mg/L)	150	0.035	1.66E+02	7.5	3.16	7.47E+02	9.13E+02
	Ra226 (Bq/L)	150	0.06	2.84E+08	7.5	0.53	1.25E+08	4.09E+08
	TDS (mg/L)	150	129	6.10E+05	7.5	1130	2.67E+05	8.77E+05
Minimum Reclamation (Long Term Predicted)	U (mg/L)	150	0.035	1.66E+02	7.5	0.1	2.37E+01	1.89E+02
	Ra226 (Bq/L)	150	0.06	2.84E+08	7.5	0.38	8.99E+07	3.74E+08
	TDS (mg/L)	150	129	6.10E+05	7.5	389	9.20E+04	7.02E+05
Max. Reclamation (Long Term Predicted)	U (mg/L)	150	0.03	1.42E+02	7.5	0.1	2.37E+01	1.66E+02
	Ra226 (Bq/L)	150	0.06	2.84E+08	7.5	0.27	6.39E+07	3.48E+08
	TDS (mg/L)	150	125	5.91E+05	7.5	414	9.79E+04	6.89E+05
Revised Predictions								
During Operations	U (mg/L)	215	0.65	4.41E+03	89.4	4.1	1.16E+04	1.60E+04
	Ra226 (Bq/L)	215	0.22	1.49E+09	89.4	0.44	1.24E+09	2.73E+09
	TDS (mg/L)	215	174	1.18E+06	89.4	1793	5.06E+06	6.23E+06
At Shutdown (Predicted)	U (mg/L)	426	0.035	4.70E+02	16	3.16	1.59E+03	2.06E+03
	Ra226 (Bq/L)	426	0.06	8.06E+08	16	0.53	2.67E+08	1.07E+09
	TDS (mg/L)	426	129	1.73E+06	16	1130	5.70E+05	2.30E+06
Minimum Reclamation (Long Term Predicted)	U (mg/L)	426	0.035	4.70E+02	16	0.1	5.05E+01	5.21E+02
	Ra226 (Bq/L)	426	0.06	8.06E+08	16	0.38	1.92E+08	9.98E+08
	TDS (mg/L)	426	129	1.73E+06	16	389	1.96E+05	1.93E+06
Max. Reclamation (Long Term Predicted)	U (mg/L)	426	0.03	4.03E+02	16	0.1	5.05E+01	4.53E+02
	Ra226 (Bq/L)	426	0.06	8.06E+08	16	0.27	1.36E+08	9.42E+08
	TDS (mg/L)	426	125	1.68E+06	16	414	2.09E+05	1.89E+06

Table 4.4.3 (Continued)
Comparison of Originally and Revised Predicted Loadings to Actual Loadings

Scenario	Parameter	AC14			TL7			Site Total Loadings
		Average Flows (L/s)	Average Concentration	Actual Loadings	Average Flows (L/s	Average Concentration	Actual Loadings	
Actual Loadings	U (mg/L)	481	0.045	6.60E+02	18.7	2.18	1.22E+03	1.88E+03
(85 – 86)	Ra226 (Bq/L)	481	0.168	2.40E+09	18.7	0.52	5.00E+08	2.90E+09
	TDS (mg/L)	481	87	1.20E+06	18.7	1435	3.00E+05	1.50E+06
Actual Loadings	U (mg/L)	587	0.05	8.86E+02	45	2.68	2.65E+03	3.54E+03
(86 – 87)	Ra226 (Bq/L)	587	0.099	1.70E+09	45	0.65	6.70E+08	2.37E+09
	TDS (mg/L)	587	84	1.60E+06	45	754	6.00E+05	2.20E+06
Actual Loadings	U (mg/L)	262	0.066	3.80E+02	11.7	2.34	2.47E+02	6.27E+02
(87 – 88)	Ra226 (Bq/L)	262	0.168	1.00E+09	11.7	0.49	6.30E+07	1.06E+09
	TDS (mg/L)	262	87	5.00E+05	11.7	915	9.00E+04	5.90E+05
Actual Loadings	U (mg/L)	650	0.03	5.94E+02	22.2	2.36	1.27E+03	1.86E+03
(88 – 89)	Ra226 (Bq/L)	650	0.128	2.70E+09	22.2	0.75	5.10E+08	3.21E+09
	TDS (mg/L)	650	73	1.50E+06	22.2	620	3.30E+05	1.83E+06
Actual Loadings	U (mg/L)	314	0.063	4.63E+02	18.9	1.91	6.02E+02	1.07E+03
(89 – 90)	Ra226 (Bq/L)	314	0.129	1.20E+09	18.9	0.58	2.60E+08	1.46E+09
	TDS (mg/L)	314	83	8.20E+05	18.9	728	2.50E+05	1.07E+06
Actual Loadings	U (mg/L)	592	0.035	5.66E+02	22	1.94	1.35E+03	1.91E+03
(90 – 91)	Ra226 (Bq/L)	592	0.073	1.05E+09	22	0.666	4.63E+08	1.51E+09
	TDS (mg/L)	592	81	1.44E+06	22	86	4.76E+05	1.92E+06
Actual Loadings	U (mg/L)	784	0.045	8.59E+02	-	1.57	-	-
(91 – 92)	Ra226 (Bq/L)	784	0.06	1.43E+09	-	0.81	-	-
	TDS (mg/L)	784	79	2.11E+06	-	444	-	-
Actual Loadings	U (mg/L)	634	0.029	6.16E+02	38	1.57	1.94E+03	2.56E+03
(92 – 93)	Ra226 (Bq/L)	634	0.06	1.18E+09	38	1.09	1.31E+09	2.49E+09
	TDS (mg/L)	634	77	1.55E+06	38	504	6.30E+05	2.18E+06
Actual Loadings	U (mg/L)	840	0.035	8.75E+02	-	1.28	1.19E+04	1.28E+04
(93 – 94)	Ra226 (Bq/L)	840	0.07	2.00E+09	-	0.95	9.74E+08	2.98E+09
	TDS (mg/L)	840	80	2.08E+06	-	457	6.30E+05	2.71E+06
Actual Loadings	U (mg/L)	432	0.048	5.10E+02	35	1.02	1.79E+03	2296
(94 – 95)	Ra226 (Bq/L)	432	0.089	1.25E+09	35	0.95	7.48E+08	2.00E+09
	TDS (mg/L)	432	77	1.05E+06	35	416	2.60E+05	1.31E+06

Table 4.4.3 (Continued)
Comparison of Originally and Revised Predicted Loadings to Actual Loadings

Scenario	Parameter	AC14			TL7			Site Total Loadings
		Average Flows (L/s)	Average Concentration	Actual Loadings	Average Flows (L/s)	Average Concentration	Actual Loadings	
Actual Loadings (95 – 96)	U (mg/L)	529	0.027	4.79E+02	30	1.13	1.07E+03	1.55E+03
	Ra226 (Bq/L)	529	0.059	1.05E+09	30	1.02	9.14E+08	1.96E+09
	TDS (mg/L)	529	76	1.24E+06	30	462	4.40E+05	1.68E+06
Actual Loadings (96 – 97)	U (mg/L)	540	0.022	3.75E+02	17.5	0.99	5.04E+02	8.79E+02
	Ra226 (Bq/L)	540	0.059	9.80E+08	17.5	1.06	5.62E+08	1.54E+09
	TDS (mg/L)	540	57	9.80E+05	17.5	369	2.00E+05	1.18E+06
Actual Loadings (97 – 98)	U (mg/L)	1314	0.028	1.18E+03	10	0.788	2.92E+02	1.47E+03
	Ra226 (Bq/L)	1314	0.067	2.74E+09	10	0.926	2.85E+08	3.03E+09
	TDS (mg/L)	1314	76	3.00E+06	10	319	1.00E+05	3.10E+06
Actual Loadings (98 – 99)	U (mg/L)	302	0.059	4.79E+02	9.3	0.718	1.92E+02	6.71E+02
	Ra226 (Bq/L)	302	0.085	8.32E+08	9.3	0.98	2.83E+08	1.12E+09
	TDS (mg/L)	302	84	7.30E+05	9.3	316	9.00E+04	8.20E+05
Actual Loadings (99 – 00)	U (mg/L)	207	0.059	3.67E+02	5.7	0.648	1.10E+02	4.77E+02
	Ra226 (Bq/L)	207	0.099	6.50E+08	5.7	0.819	1.50E+08	8.00E+08
	TDS (mg/L)	207	77	5.08E+05	5.7	322	5.57E+04	5.64E+05
Actual Loadings (00 – 01)	U (mg/L)	586.3	0.039	7.00E+02	27.3	0.658	5.45E+02	1.25E+03
	Ra226 (Bq/L)	586.3	0.052	8.90E+08	27.3	0.95	8.25E+08	1.72E+09
	TDS (mg/L)	586.3	76.08	1.40E+06	27.3	309	2.60E+05	1.66E+06
Actual Loadings (01 – 02)	U (mg/L)	598.8	0.034	6.01E+02	13.2	0.588	1.75E+02	7.76E+02
	Ra226 (Bq/L)	598.8	0.056	1.10E+09	13.2	0.93	3.40E+08	1.44E+09
	TDS (mg/L)	598.8	77	1.40E+06	13.2	278	9.00E+04	1.49E+06
Actual Loadings (02 – 03)	U (mg/L)	913	0.029	8.27E+02	34	0.567	4.93E+02	1.32E+03
	Ra226 (Bq/L)	913	0.05	1.34E+09	34	1.24	1.22E+09	2.56E+09
	TDS (mg/L)	913	78.5	2.10E+06	34	278	2.52E+05	2.35E+06
Actual Loadings (03 – 04)	U (mg/L)	504	0.035	5.02E+02	19.5	0.515	2.91E+02	7.93E+02
	Ra226 (Bq/L)	504	0.053	7.55E+08	19.5	1.27	7.70E+08	1.53E+09
	TDS (mg/L)	504	71.25	1.14E+06	19.5	253	1.60E+05	1.30E+06
Actual Loadings (04 – 05)	U (mg/L)	362	0.035	3.41E+02	11.3	0.606	1.56E+02	4.97E+02
	Ra226 (Bq/L)	362	0.0696	6.80E+08	11.3	1.233	4.36E+08	1.12E+09
	TDS (mg/L)	362	76.39	8.45E+05	11.3	335	9.61E+04	9.41E+05

Table 4.4.3 (Continued)
Comparison of Originally and Revised Predicted Loadings to Actual Loadings

Scenario	Parameter	AC14			TL7			Site Total Loadings
		Average Flows (L/s)	Average Concentration	Actual Loadings	Average Flows (L/s)	Average Concentration	Actual Loadings	
Actual Loadings (05 – 06)	U	655	0.04	7.79E+02	26.1	0.428	3.31E+02	1.11E+03
	Ra226	655	0.048	1.08E+09	26.1	1.112	9.71E+08	2.05E+09
	TDS	655	76.7	1.54E+06	26.1	226	1.83E+05	1.72E+06
Actual Loadings (06 – 07)	U	290.6	0.045	3.69E+02	9.99	0.371	1.07E+02	4.76E+02
	Ra226	290.6	0.06	5.14E+08	9.99	1.27	4.40E+08	9.54E+08
	TDS	290.6	83	7.33E+05	9.99	243.9	7.38E+04	8.07E+05
Actual Loadings (07 – 08)	U	562.30	0.03	5.62E+02	18.91	0.36	2.06E+02	7.68E+02
	Ra226	562.30	0.05	8.60E+09	18.91	1.46	9.25E+08	1.79E+09
	TDS	562.30	81.50	1.45E+06	18.91	242.58	1.45E+05	1.60E+06
Actual Loadings (2008)	U	522.49	0.03	4.43E+02	18.91	0.31	1.83E+02	6.26E+02
	Ra226	522.49	0.05	7.78E+08	18.91	1.72	9.73E+08	1.75E+09
	TDS	522.49	71.58	1.16E+06	18.91	249.58	1.46E+05	1.31E+06
Actual Loadings (2009)	U	544	0.024	4.02E+02	11.5	0.328	9.29E+01	4.94E+02
	Ra226	544	0.03	4.86E+08	11.5	1.27	4.40E+08	9.26E+08
	TDS	544	73	1.31E+06	11.5	222	7.19E +04	1.38E+06
Actual Loadings (2010[a])	U	387	0.020	1.23E+02	6.3	0.319	2.69E+01	1.50E+02
	Ra226	387	0.03	2.04E+08	6.3	1.55	1.65E+08	3.69E+08
	TDS	387	79.5	4.86E+05	6.3	249.5	2.33E+04	5.09E+05

Note: Loading values in this table were calculated using monthly flow volumes, not the annual averages that are presented in this table.

Table 4.5.1
Radon Track Etch Cup Summary

Location	1982 (Pci/L)	2006 (Pci/L)	2007 (Pci/L)	2008 (Pci/L)	2009 (Pci/L)
Airport Beacon	1.4	0.4	0.3	0.5	0.4
Eldorado Townsite	3.7	0.7	0.4	0.7	0.7
Northwest of Airport	2.4	0.4	0.2	0.3	0.2
Ace Creek	10.7	6.3	4.9	6.7	6.1
Fay Waste Rock	5.1	1.4	1.1	1.2	1.2
Fookes Delta	5.1	3.1	2.9	3	2.3
Marie Lake	5.1	2.5	2.5	2.7	2.7
Donaldson Lake	5.1	0.3	0.2	0.7	0.1
Fredette Lake	5.1	0.4	0.2	0.3	0.2
Uranium City	5.1	0.2	0.2	0.3	< 0.1

FIGURES

FIGURES

Figure 2.4.1
Beaverlodge Location Map

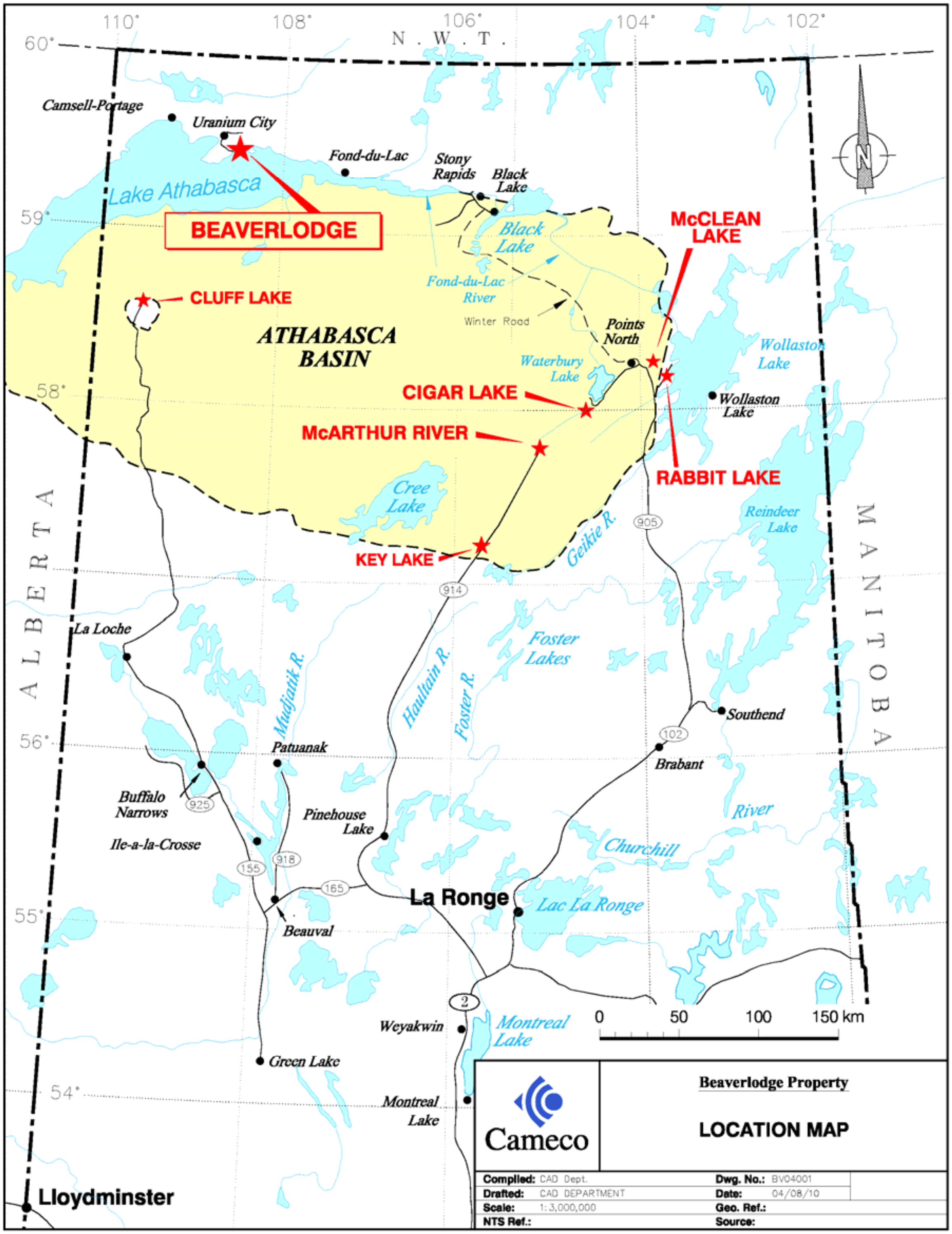


Figure 4.3.1
Aquatic Sampling Station Locations

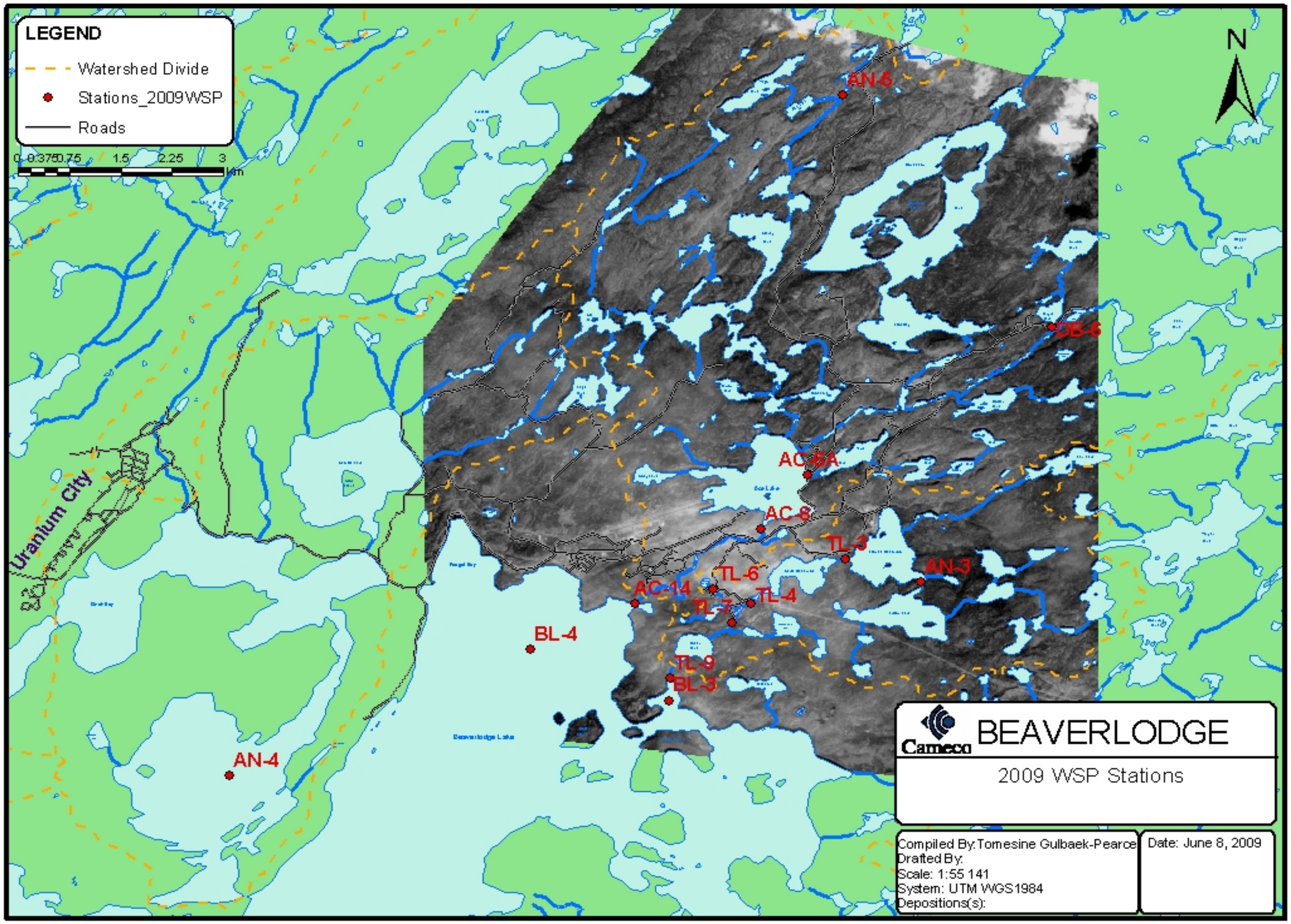


Figure 4.3.2 AN-5 - Pistol Creek below Hab Site

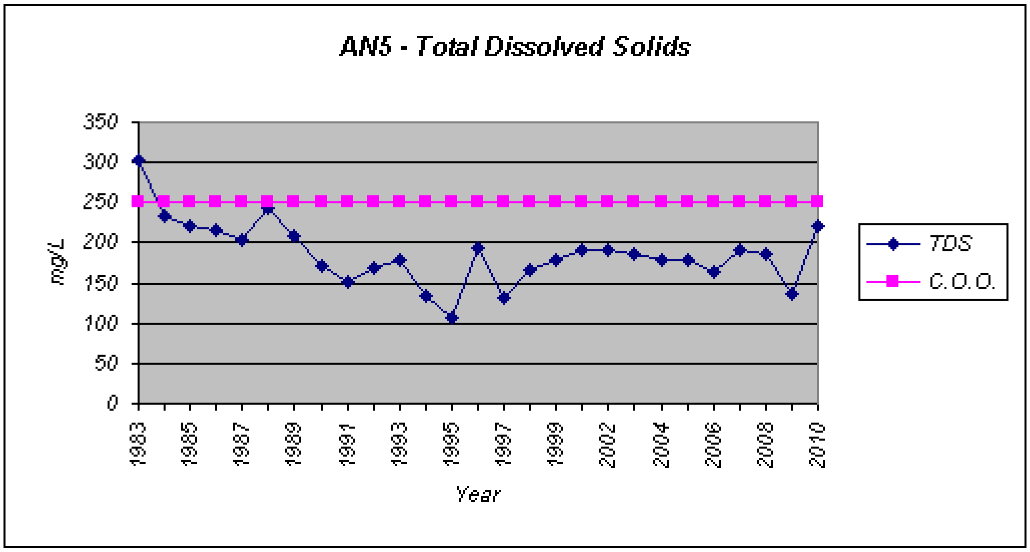


Figure 4.3.3 AN-5 - Pistol Creek below Hab Site

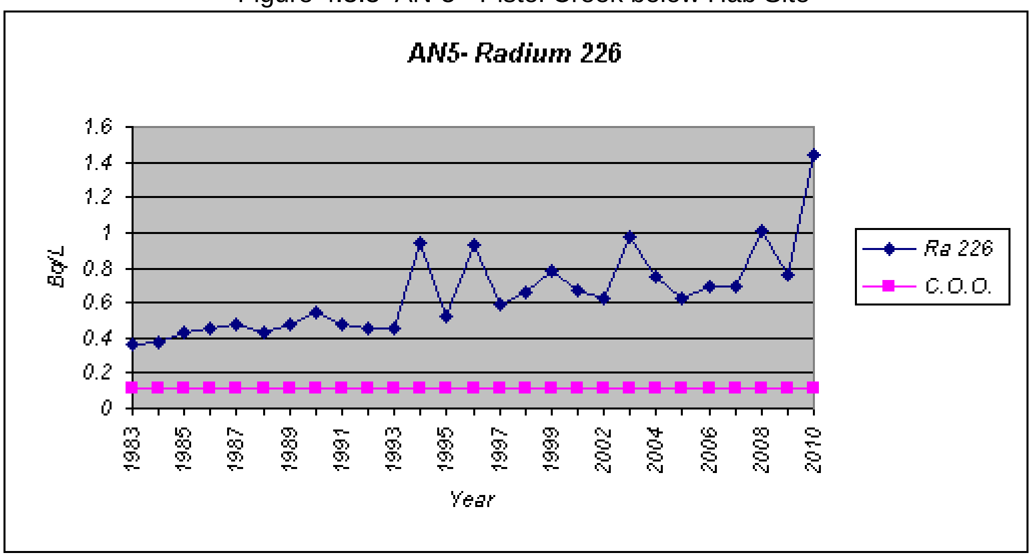


Figure 4.3.4 AN-5 - Pistol Creek below Hab Site

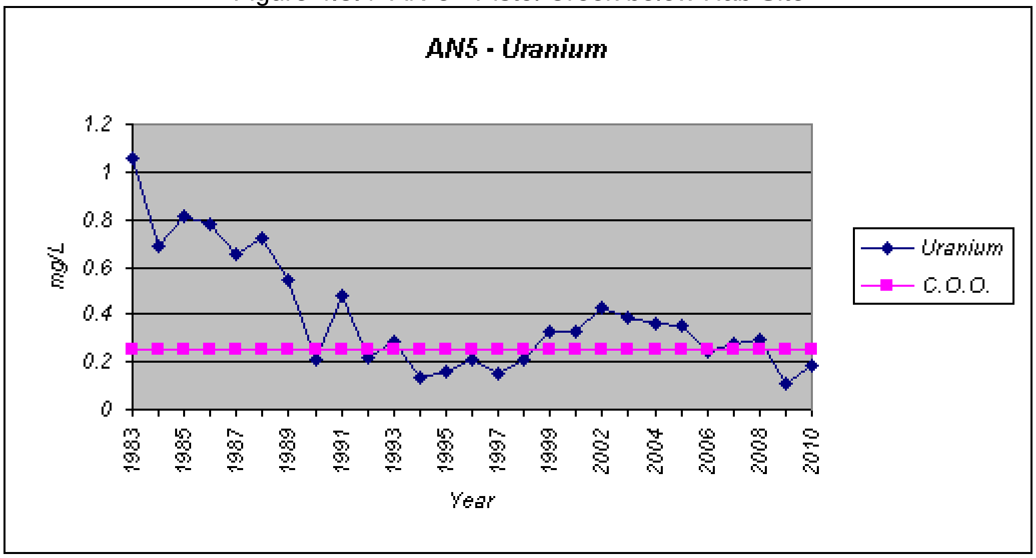


Figure 4.3.5 AN-5 - Pistol Creek below Hab Site

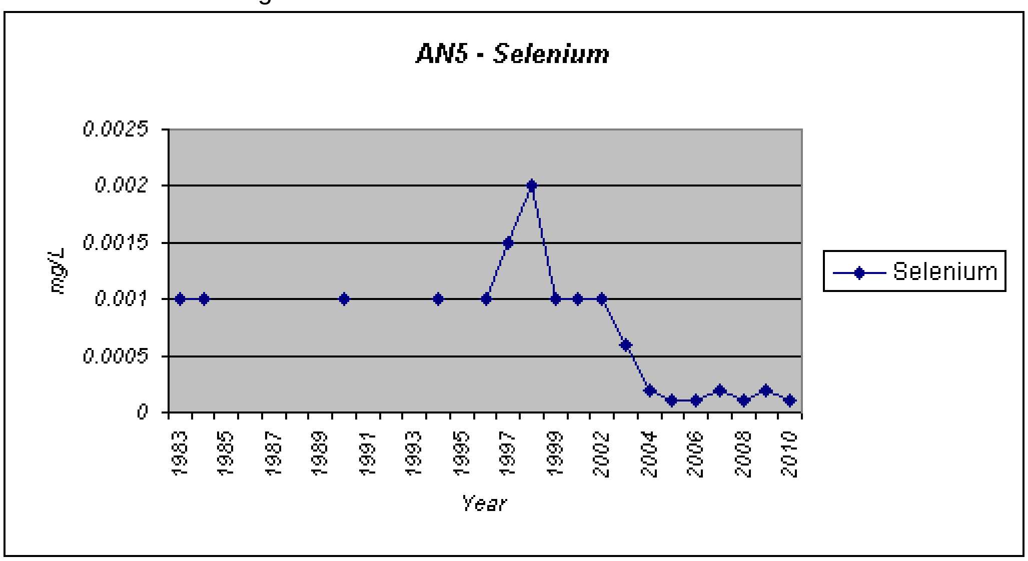


Figure 4.3.6 DB-6 - Dubyna Creek

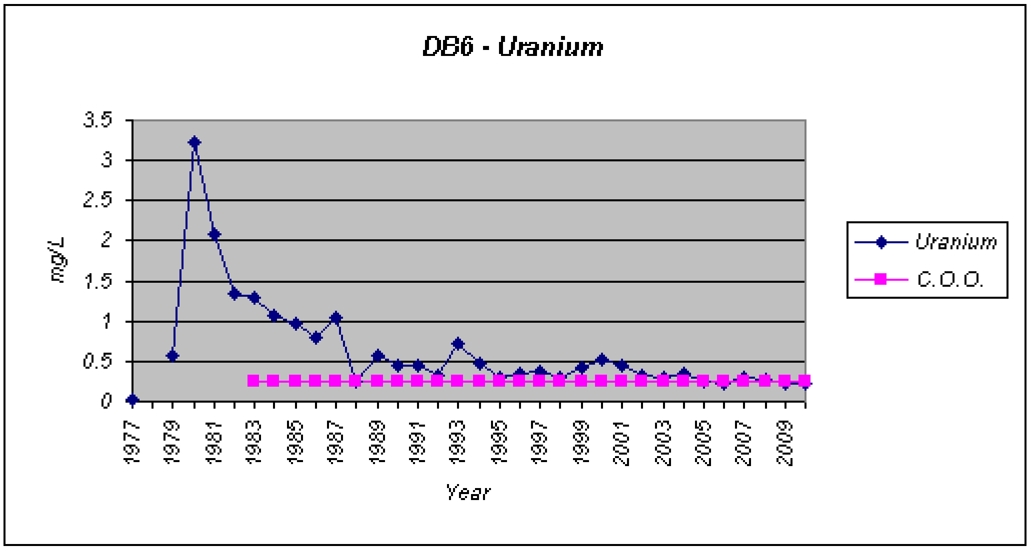


Figure 4.3.7 DB-6 - Dubyna Creek

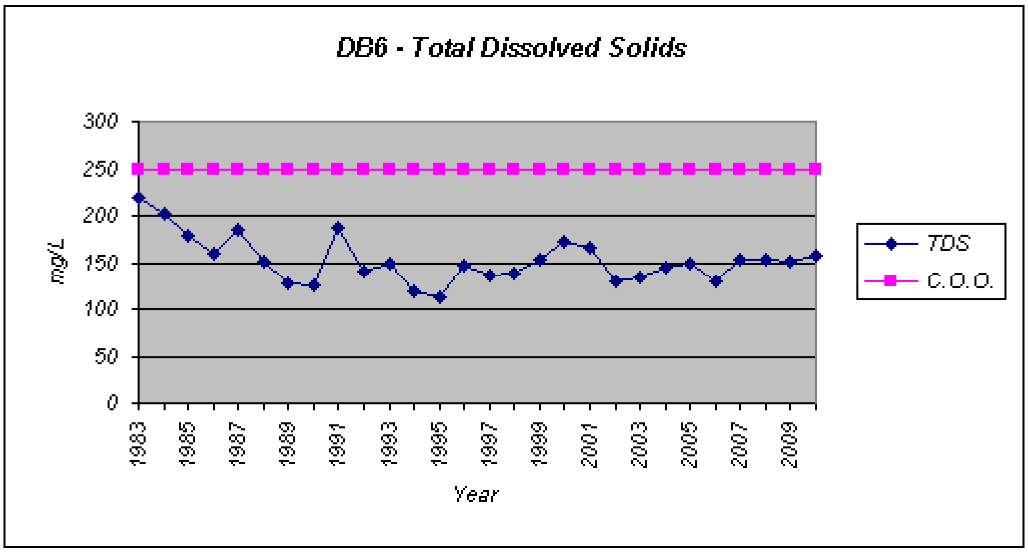


Figure 4.3.8 DB-6 - Dubyna Creek

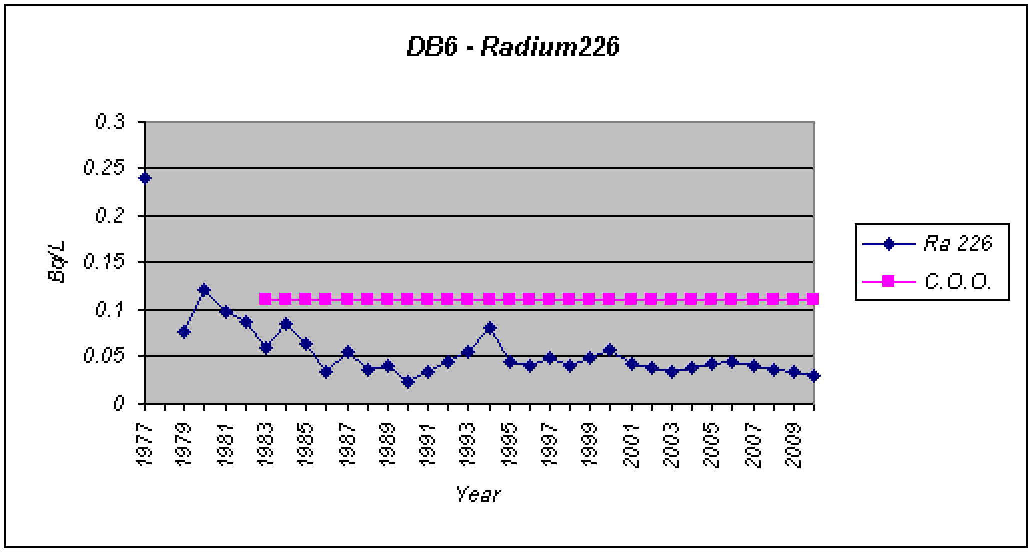


Figure 4.3.9 DB-6 - Dubyna Creek

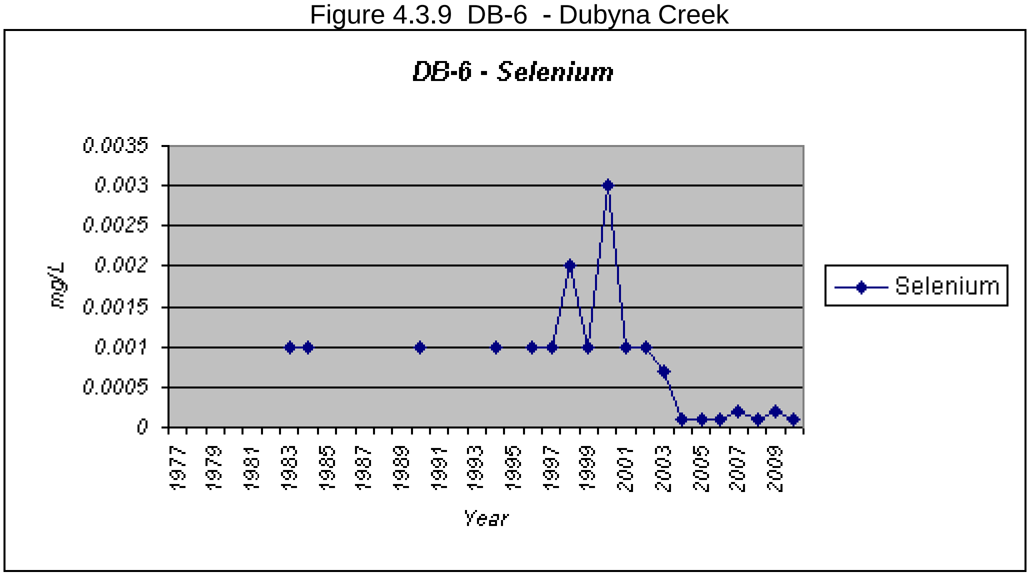


Figure 4.3.10 AC-8 - Ace Lake Outlet to Ace Creek

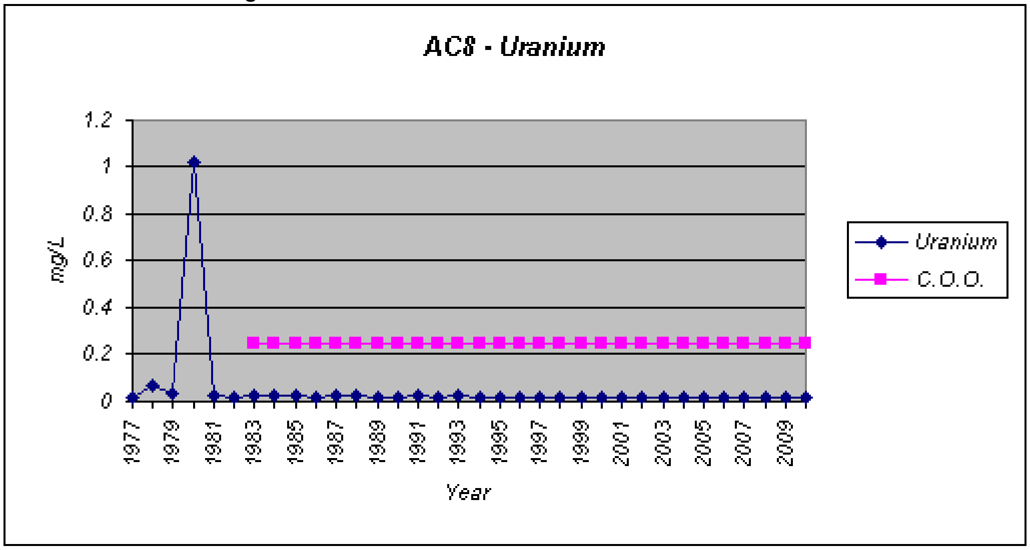


Figure 4.3.11 AC-8 - Ace Lake Outlet to Ace Creek

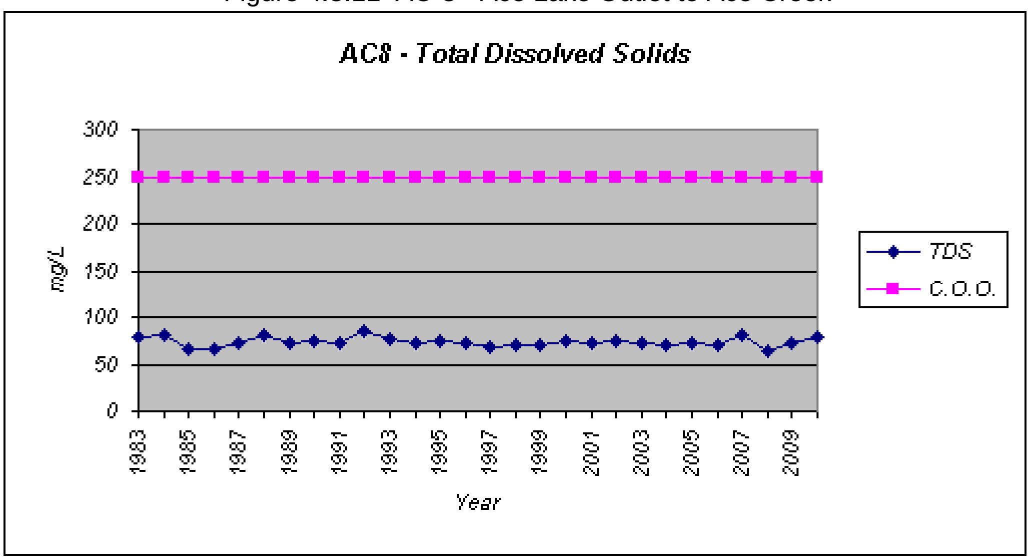


Figure 4.3.12 AC-8 - Ace Lake Outlet to Ace Creek

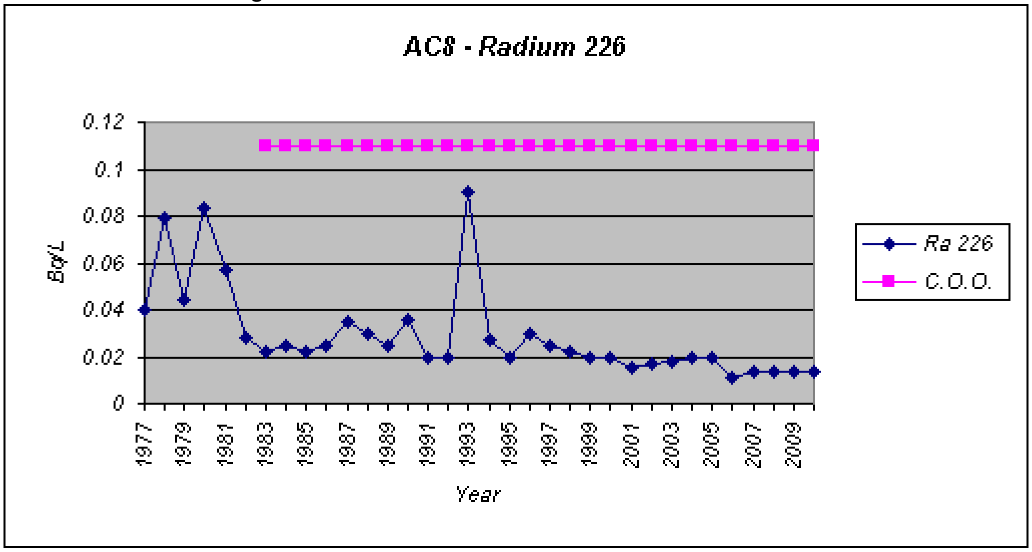


Figure 4.3.13 AC-14 - Ace Creek

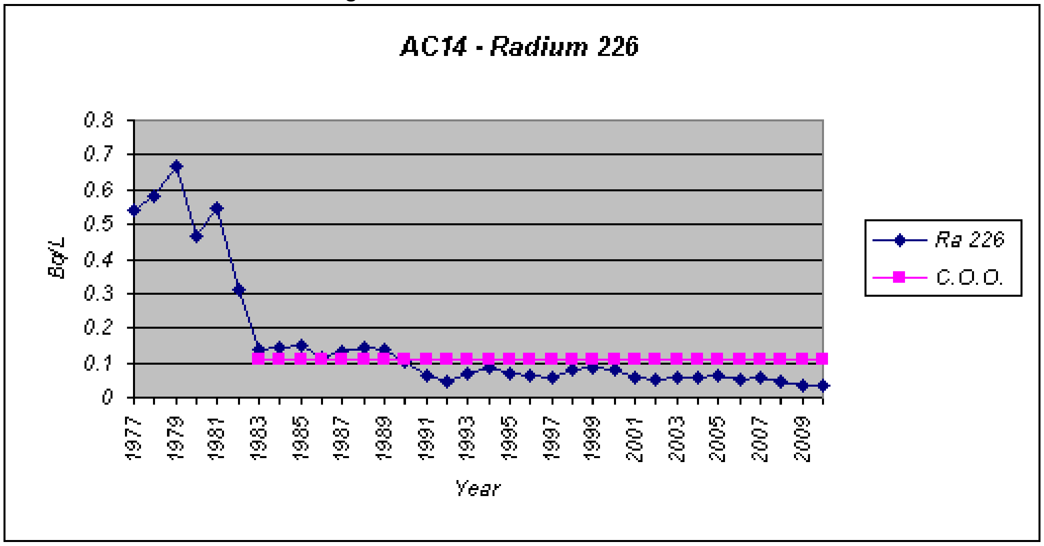


Figure 4.3.14 AC-14 - Ace Creek

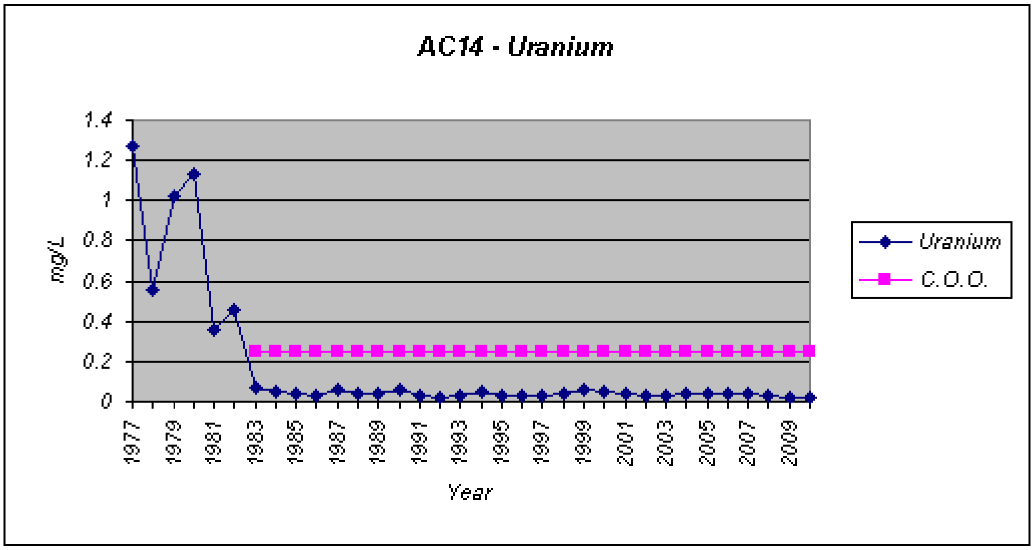


Figure 4.3.15 AC-14 - Ace Creek

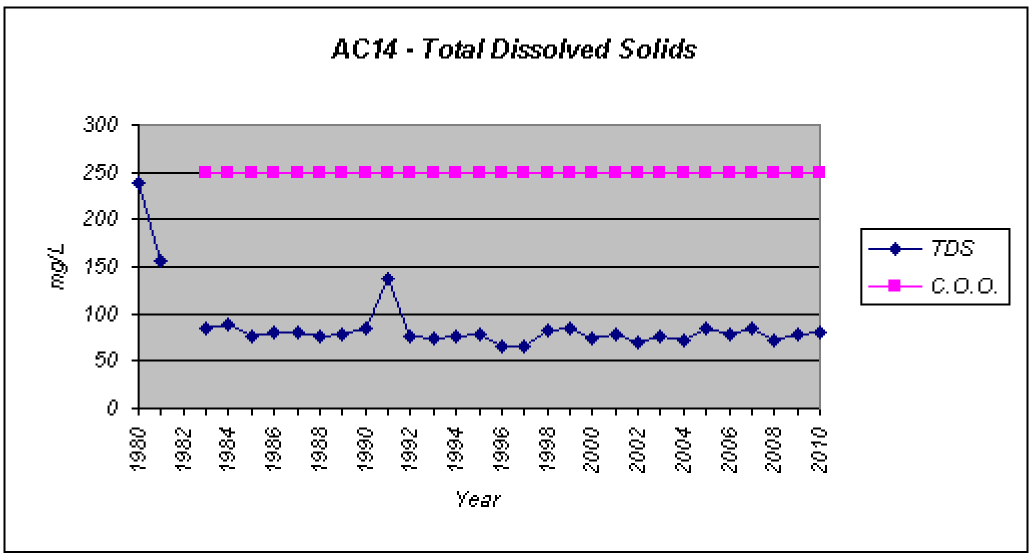


Figure 4.3.16 AC-14 - Ace Creek

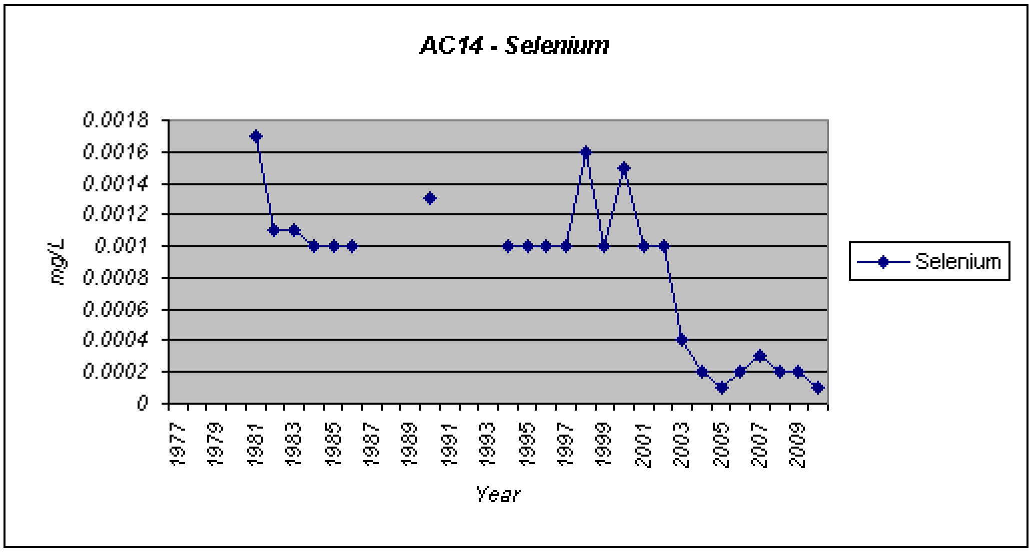


Figure 4.3.17 AN-3 - Fulton Lake (upstream of TL Stations)

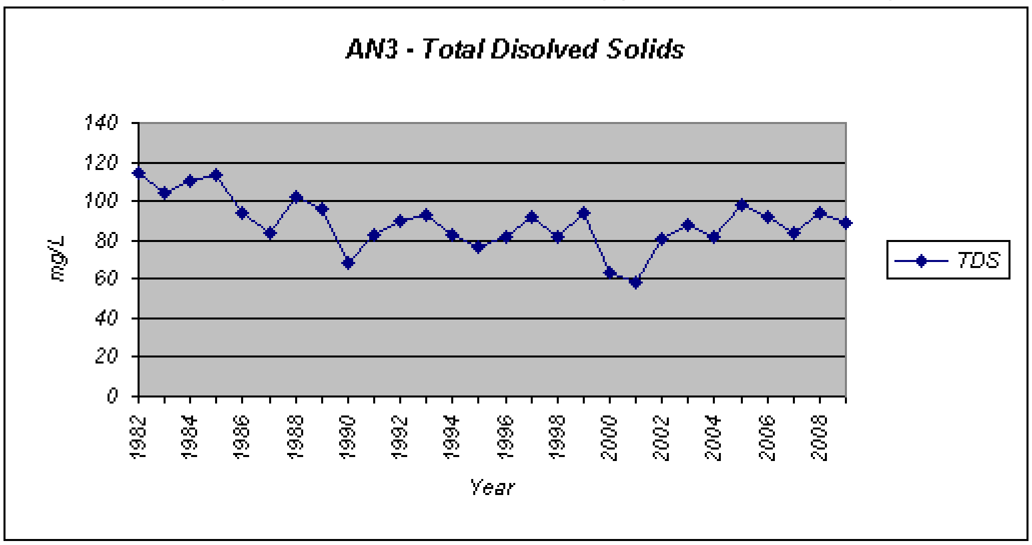


Figure 4.3.18 AN-3 - Fulton Lake (upstream of TL Stations)

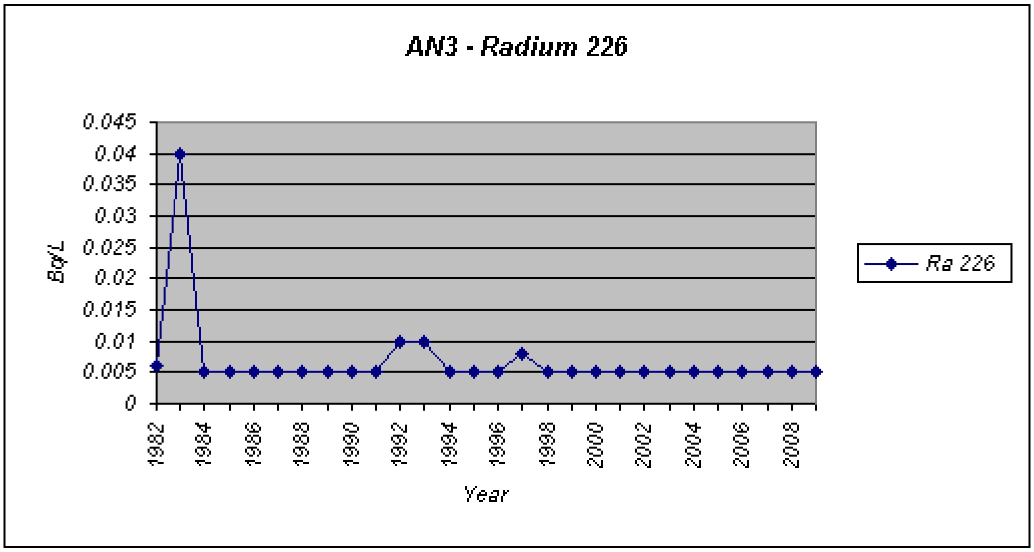


Figure 4.3.19 AN-3 - Fulton Lake (upstream of TL Stations)

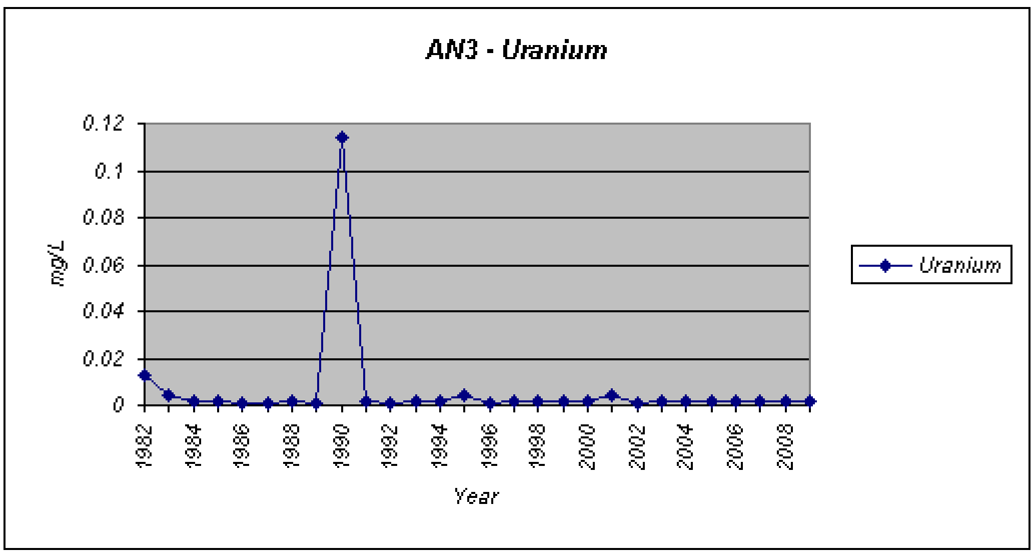
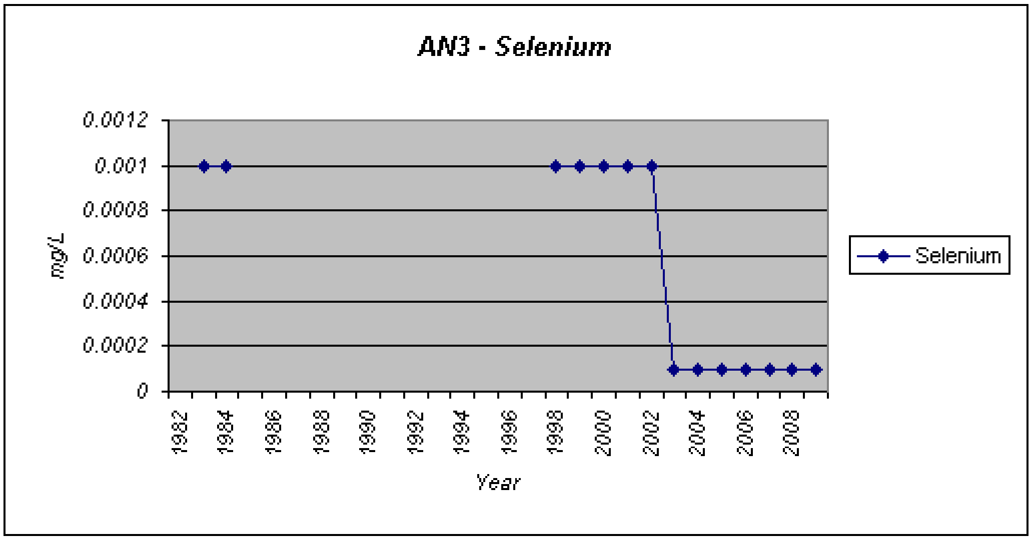


Figure 4.3.20 AN-3 - Fulton Lake (upstream of TL Stations)



Note: Method detection limit changed from 0.001 mg/L to 0.0001 mg/L in 2003

Figure 4.3.21 TL-3 - Fookes Reservoir Discharge

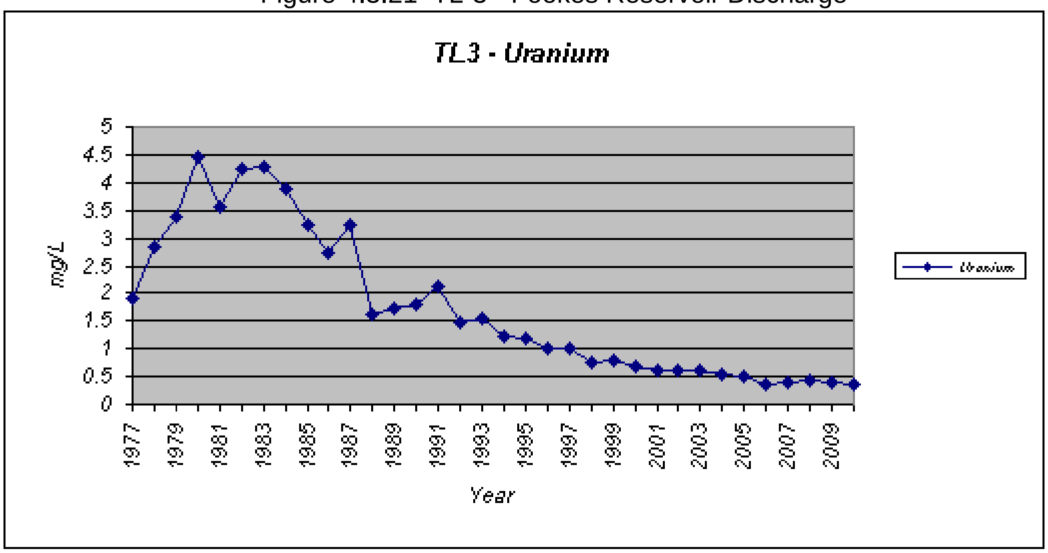


Figure 4.3.22 TL-3 - Fookes Reservoir Discharge

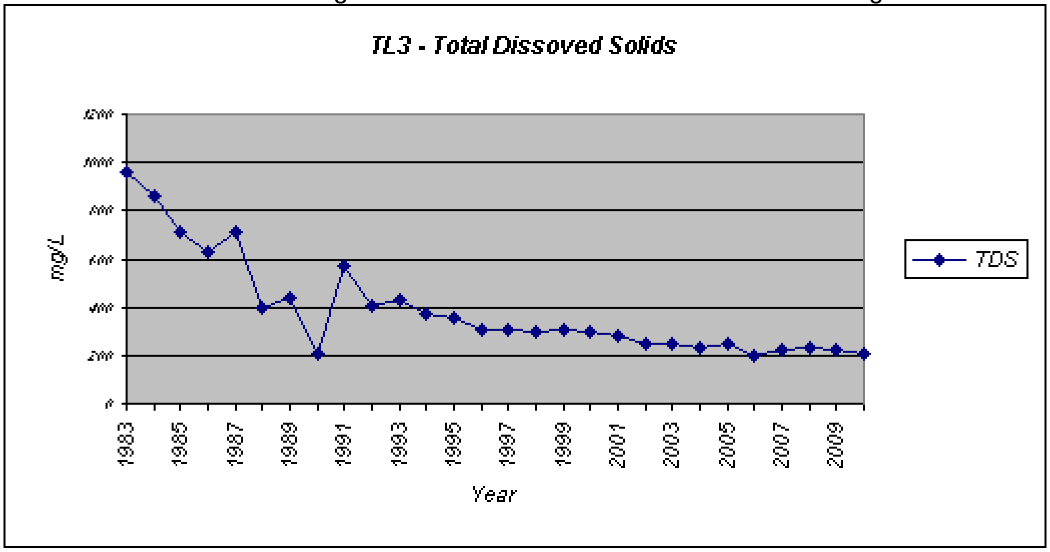


Figure 4.3.23 TL-3 - Fookes Reservoir Discharge

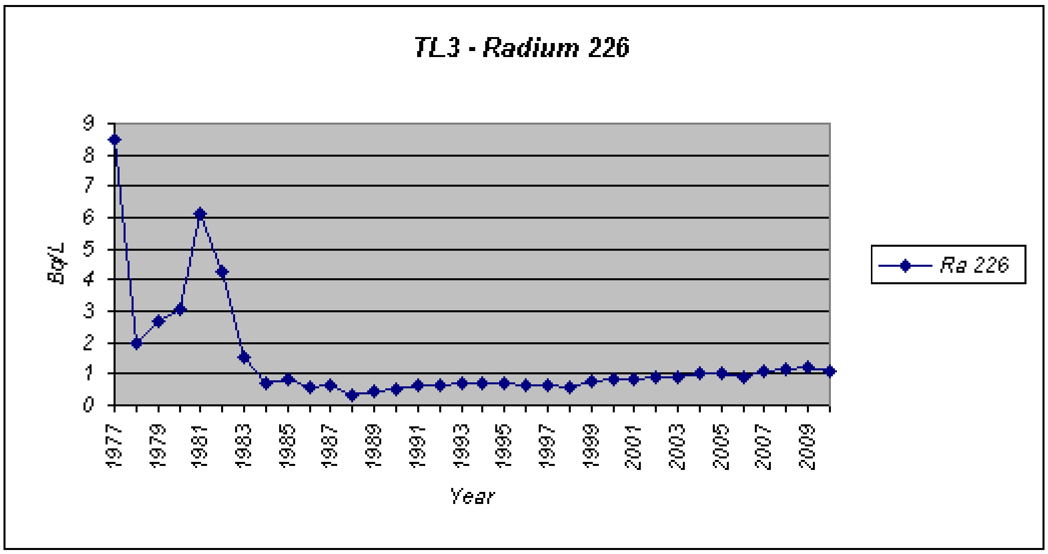


Figure 4.3.24 TL-3 - Fookes Reservoir Discharge

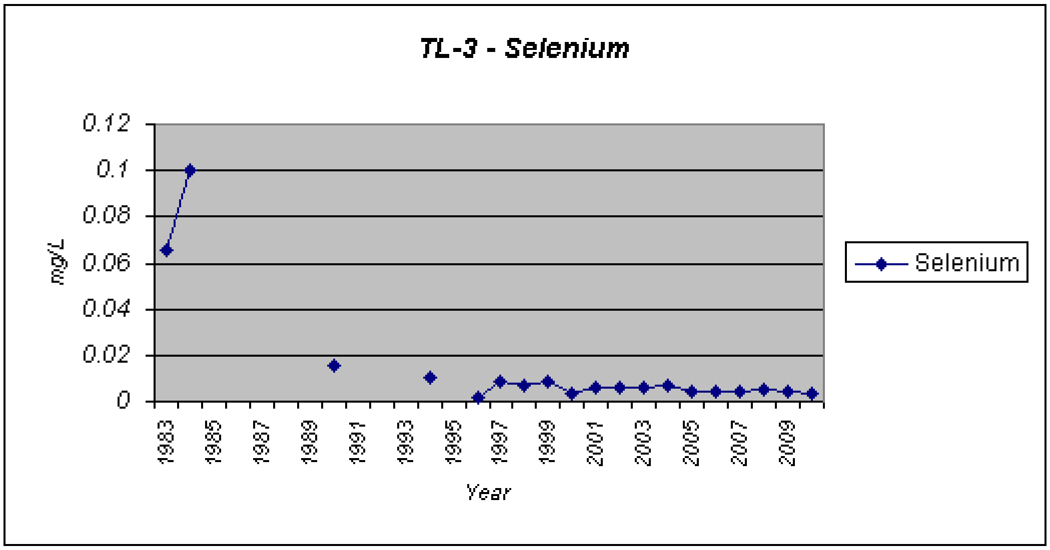


Figure 4.3.25 TL-4 - Marie Reservoir Discharge

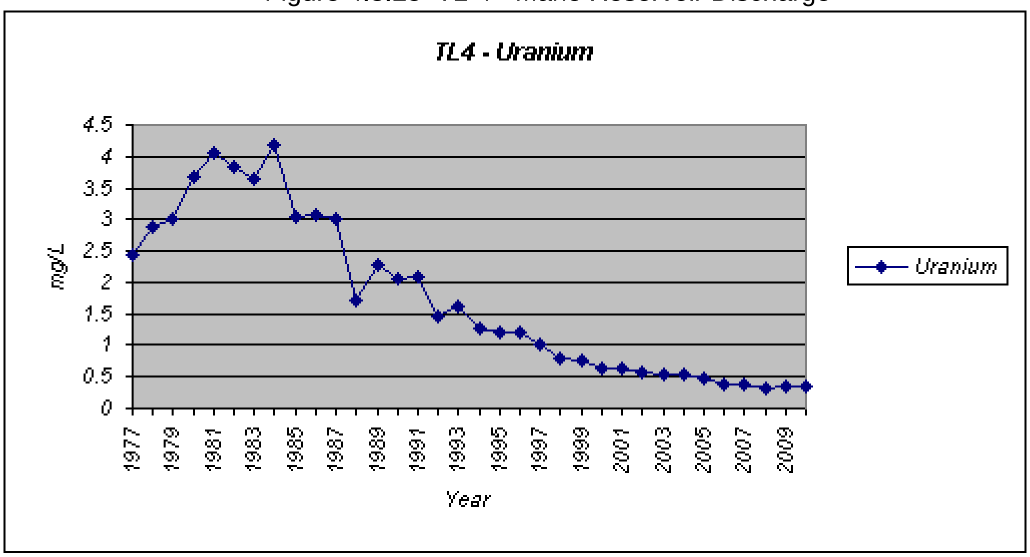


Figure 4.3.26 TL-4 - Marie Reservoir Discharge

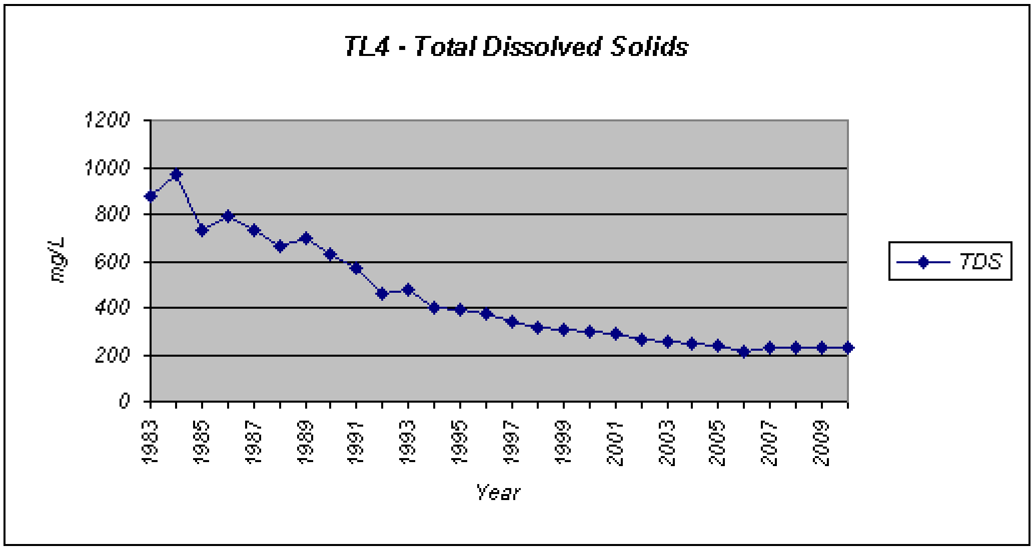


Figure 4.3.27 TL-4 - Marie Reservoir Discharge

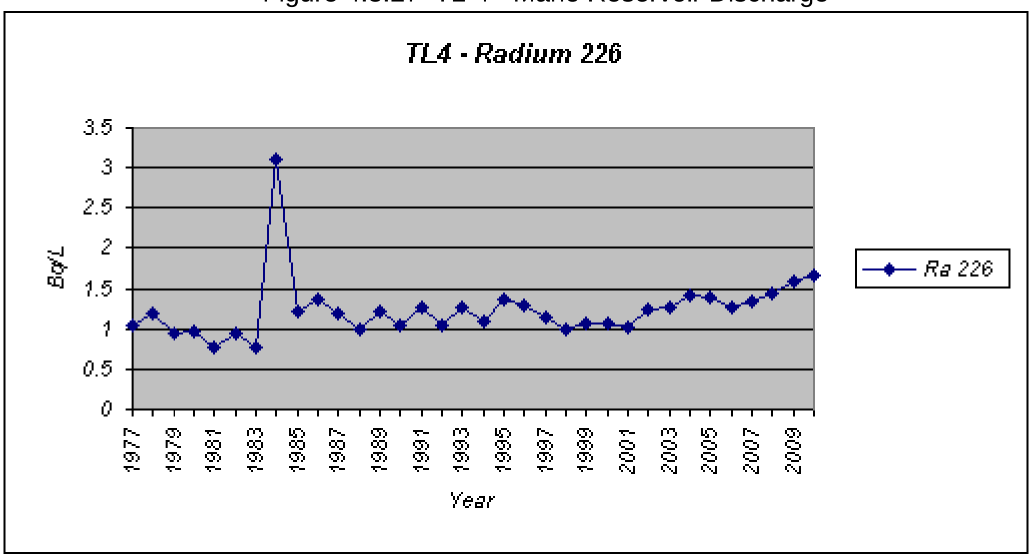


Figure 4.3.28 TL-4 - Marie Reservoir Discharge

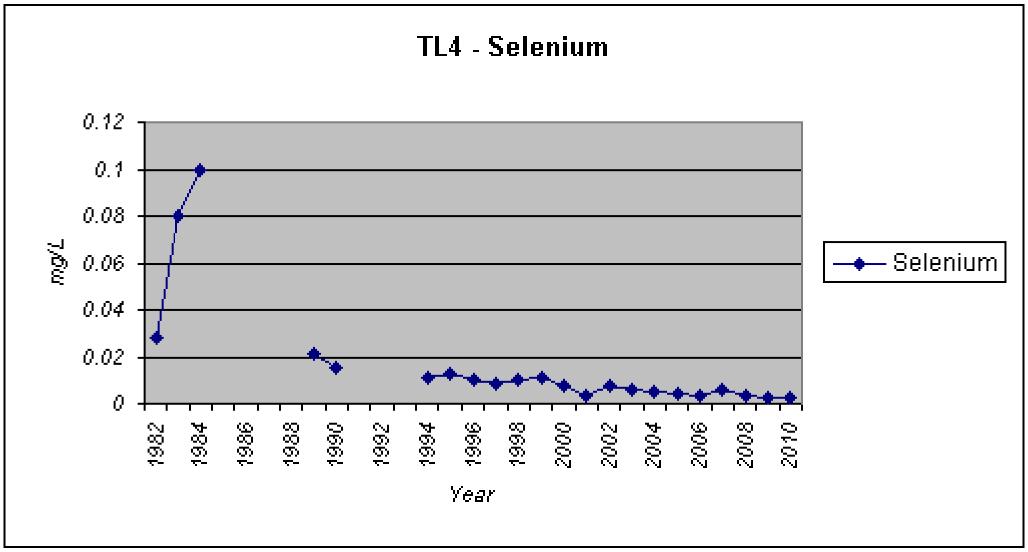


Figure 4.3.29 TL-6 - Minewater Reservoir Discharge

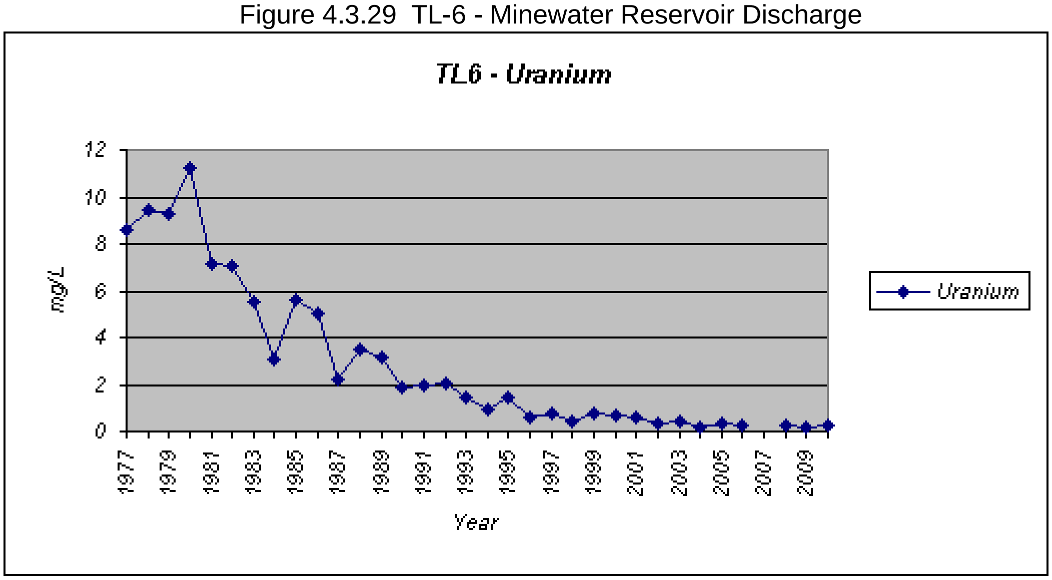


Figure 4.3.30 TL-6 - Minewater Reservoir Discharge

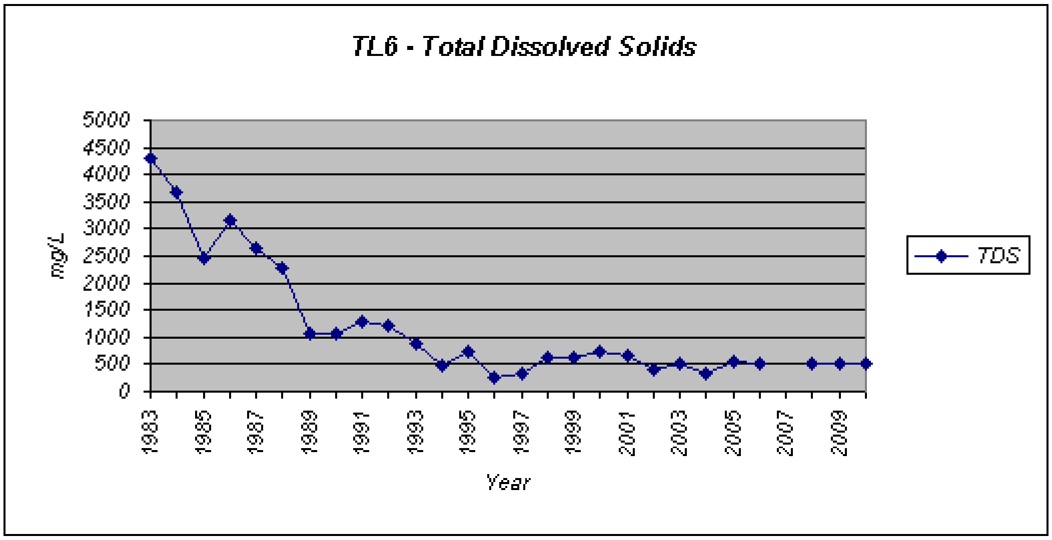


Figure 4.3.31 TL-6 - Minewater Reservoir Discharge

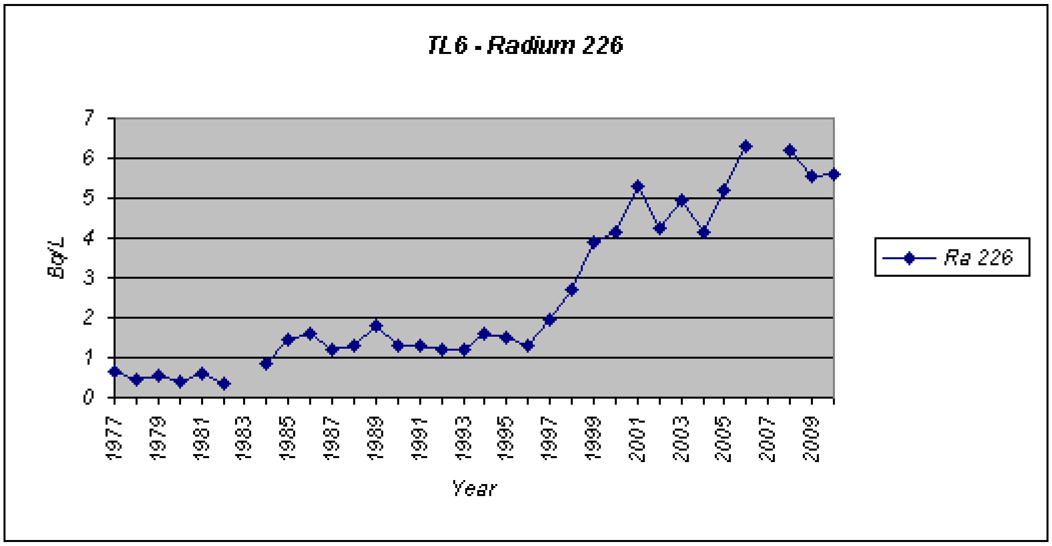


Figure 4.3.32 TL-6 - Minewater Reservoir Discharge

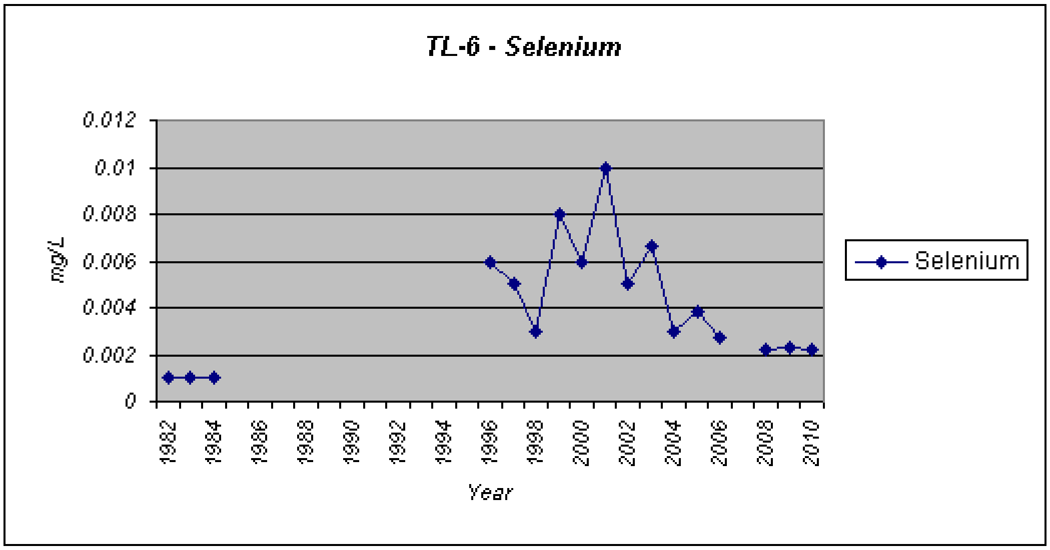


Figure 4.3.33 TL-7 - Meadow Lake Discharge

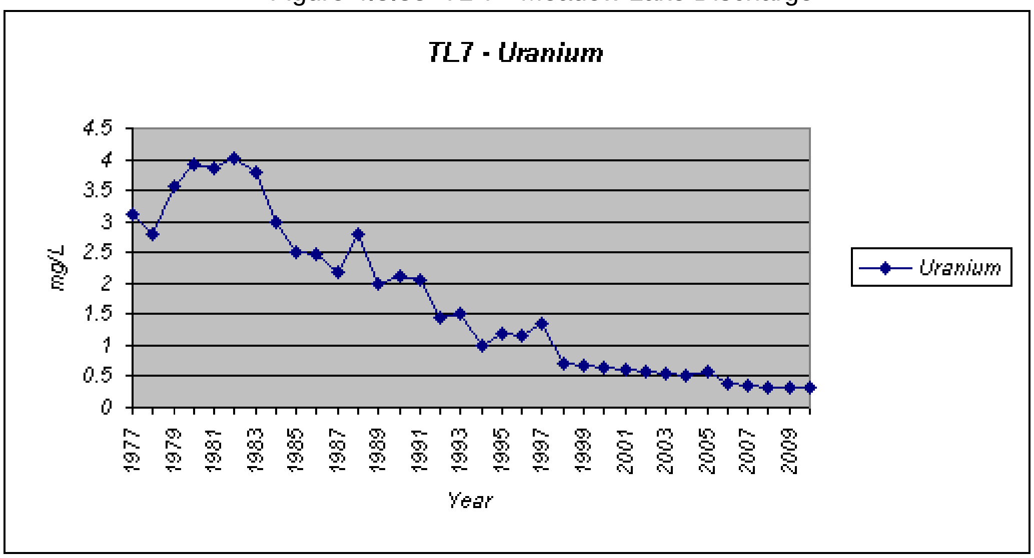


Figure 4.3.34 TL-7 - Meadow Lake Discharge

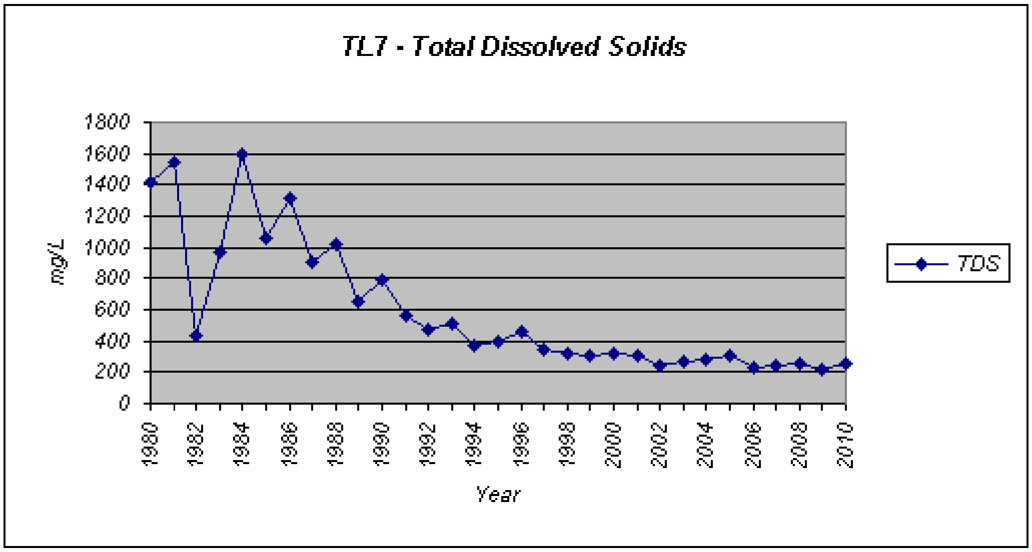


Figure 4.3.35 TL-7 - Meadow Lake Discharge

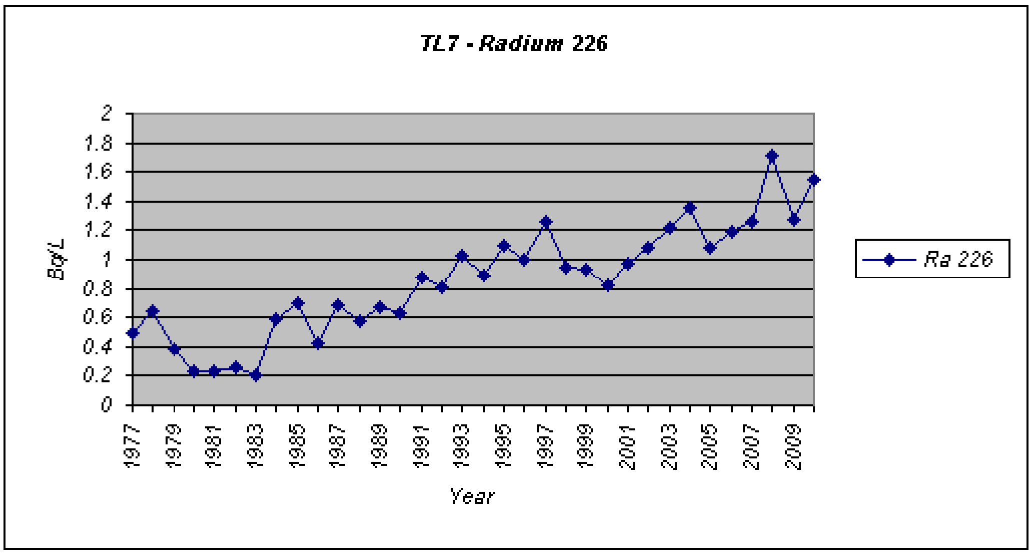


Figure 4.3.36 TL-7 - Meadow Lake Discharge

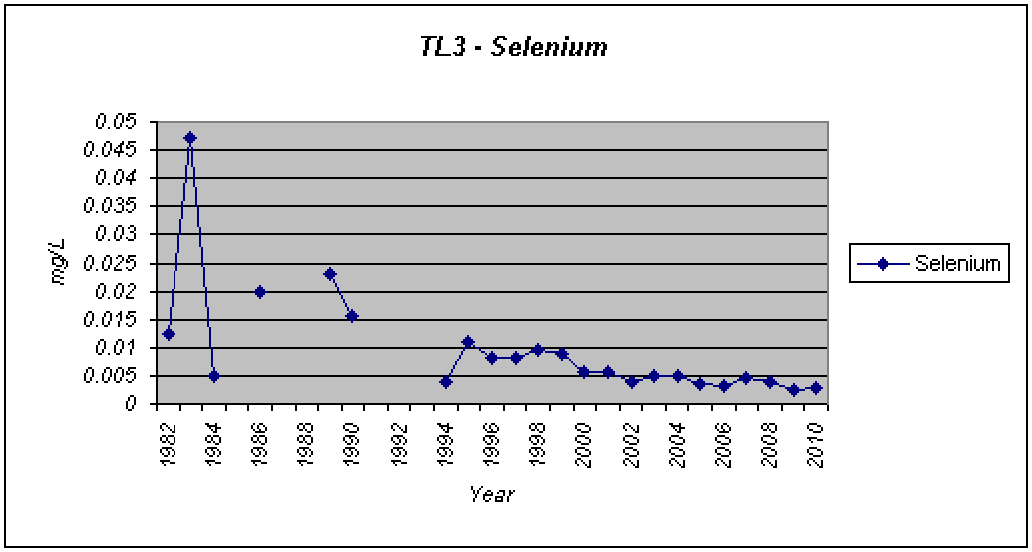


Figure 4.3.37 TL-9 - Fulton Creek Below Greer Lake

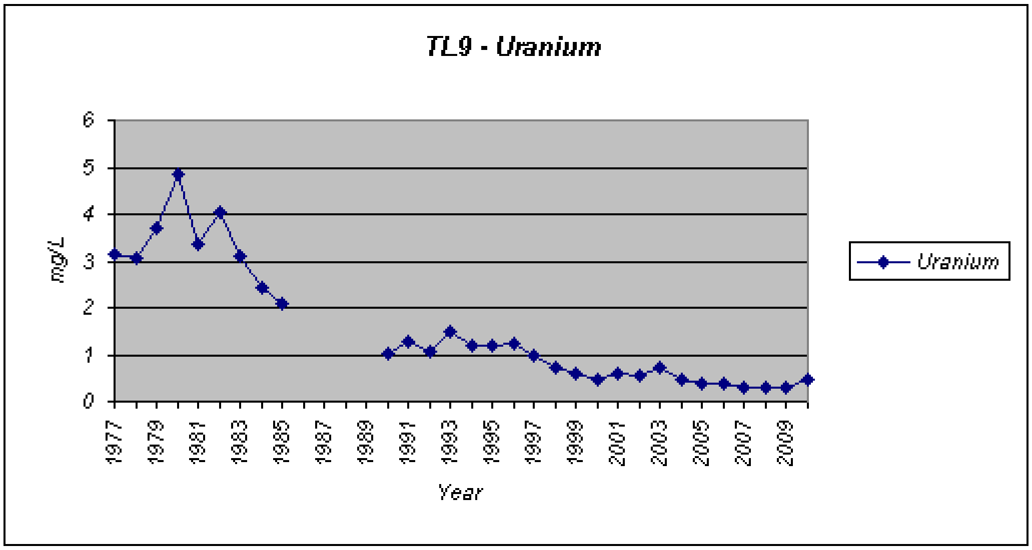


Figure 4.3.38 TL-9 - Fulton Creek Below Greer Lake

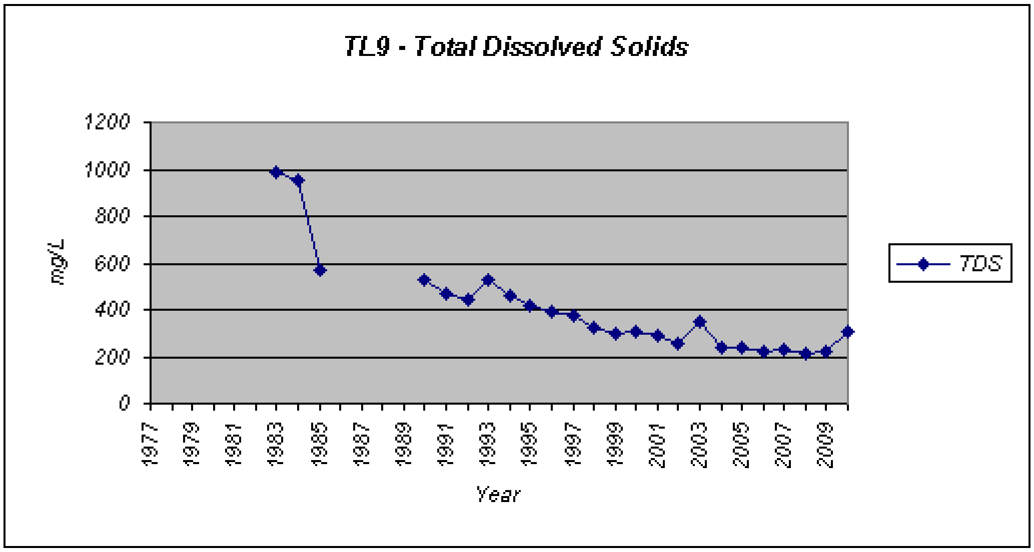


Figure 4.3.39 TL-9 - Fulton Creek Below Greer Lake

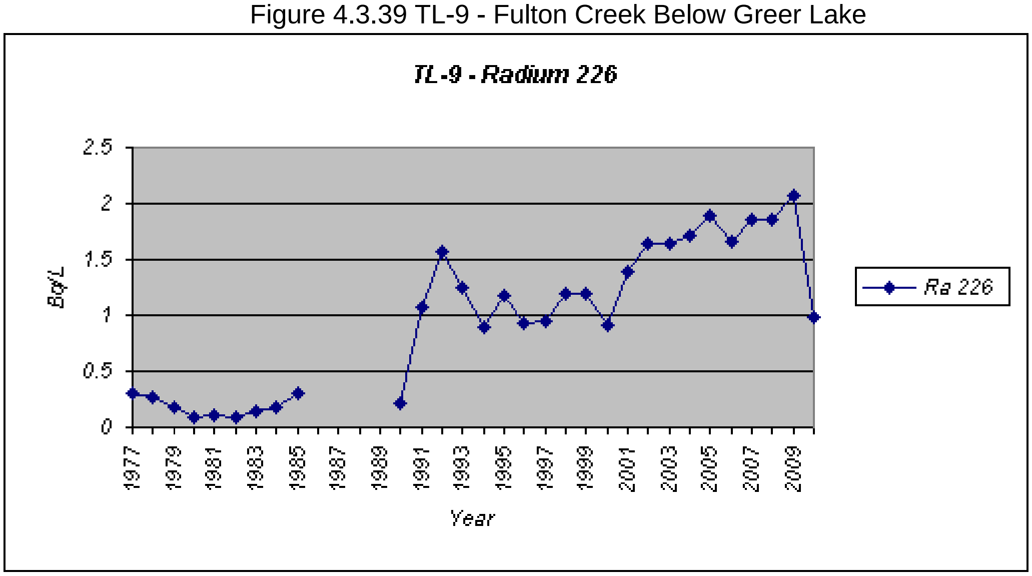


Figure 4.3.40 TL-9 - Fulton Creek Below Greer Lake

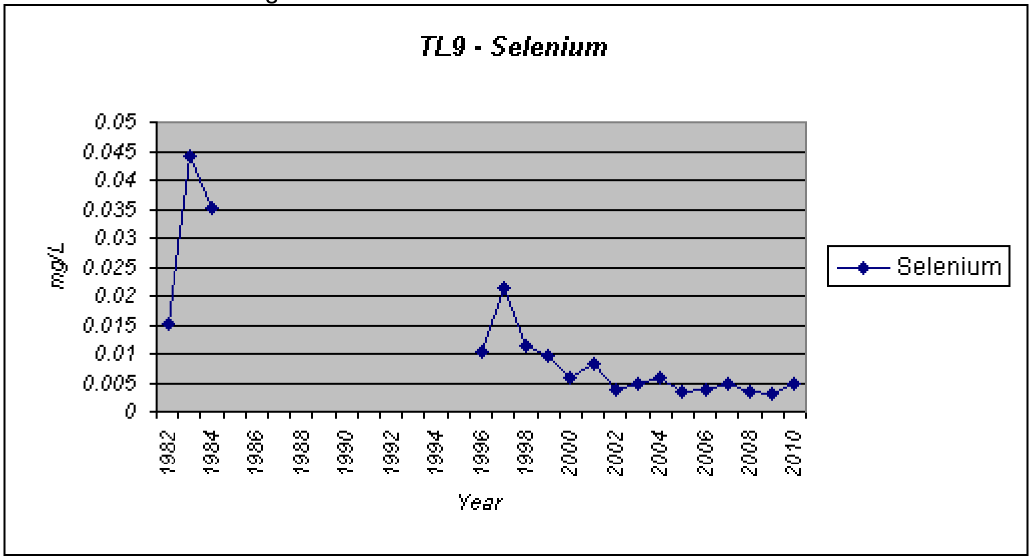


Figure 4.3.41 BL-3 - Beaverlodge Lake Opposite Fulton Creek Discharge

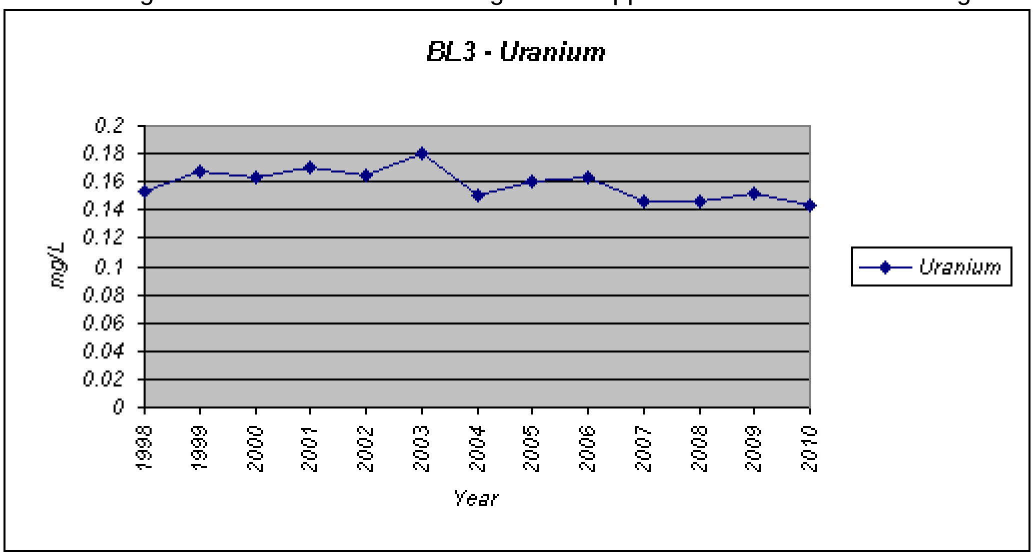


Figure 4.3.42 BL-3 - Beaverlodge Lake Opposite Fulton Creek Discharge

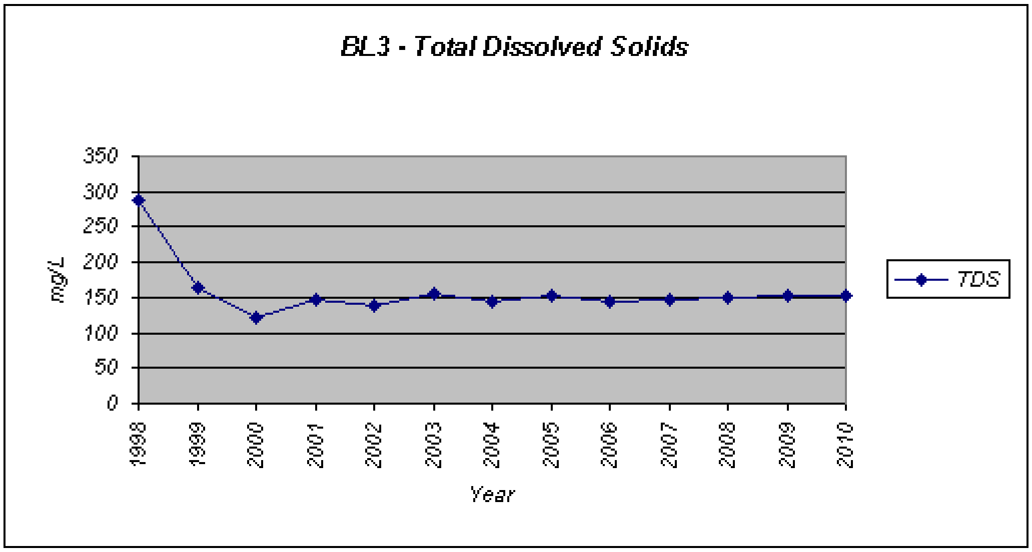


Figure 4.3.43 BL-3 - Beaverlodge Lake Opposite Fulton Creek Discharge

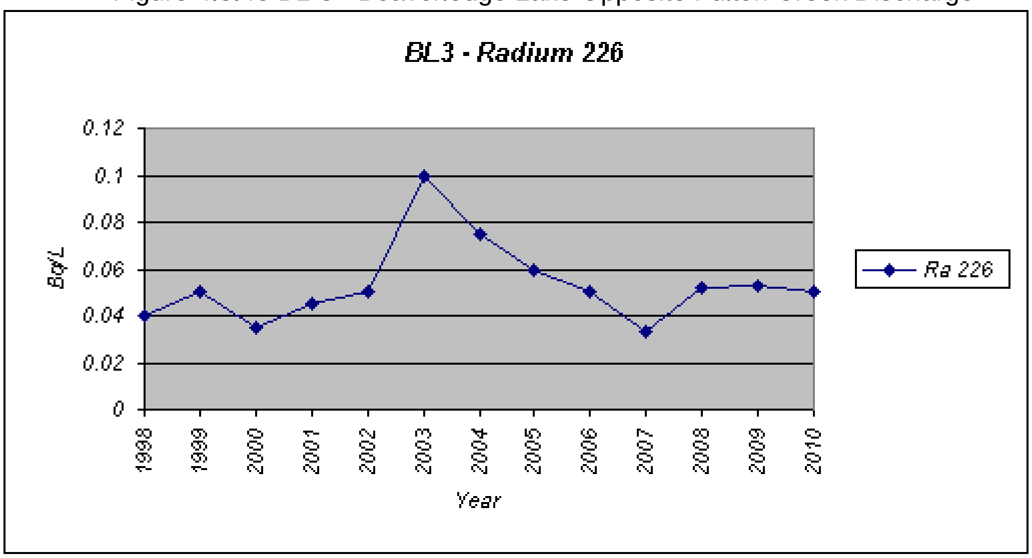


Figure 4.3.44 BL-3 - Beaverlodge Lake Opposite Fulton Creek Discharge

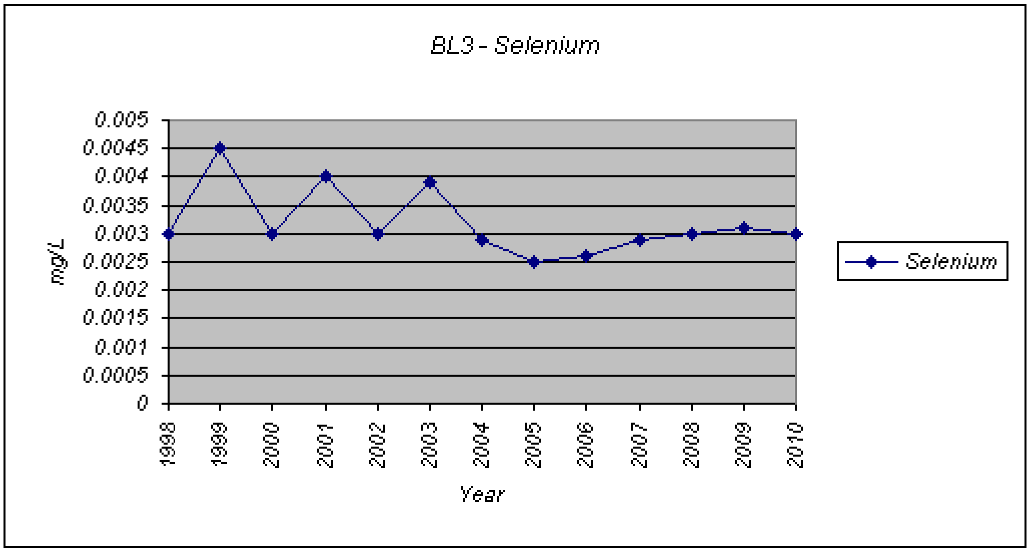


Figure 4.3.45 BL-4 - Beaverlodge Lake Centre

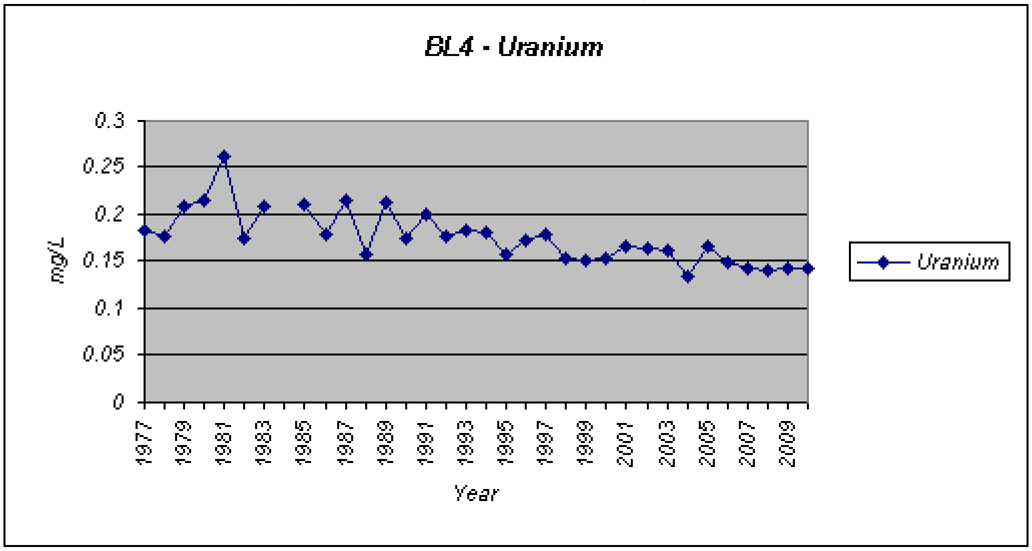


Figure 4.3.46 BL-4 - Beaverlodge Lake Centre

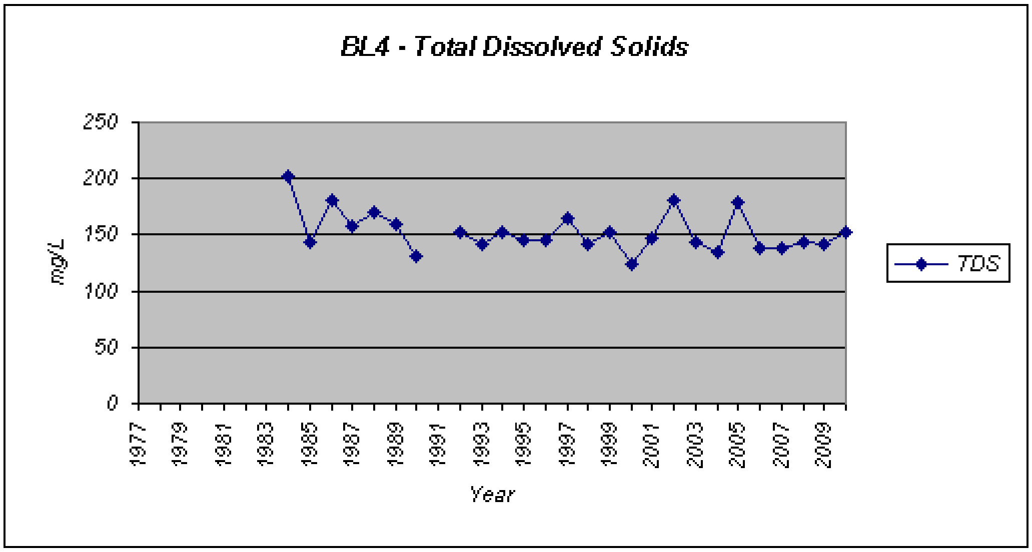


Figure 4.3.47 BL-4 - Beaverlodge Lake Centre

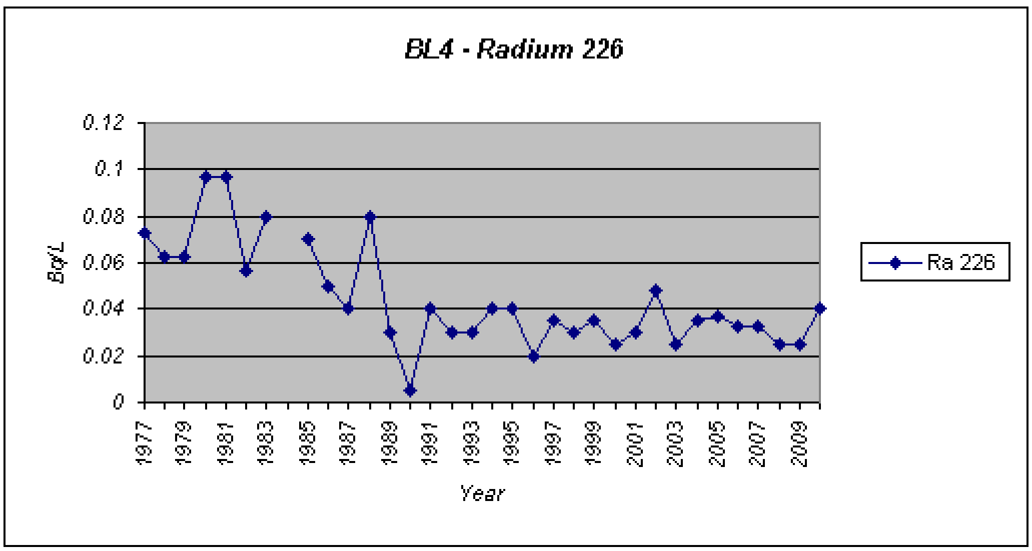


Figure 4.3.48 BL-4 - Beaverlodge Lake Centre

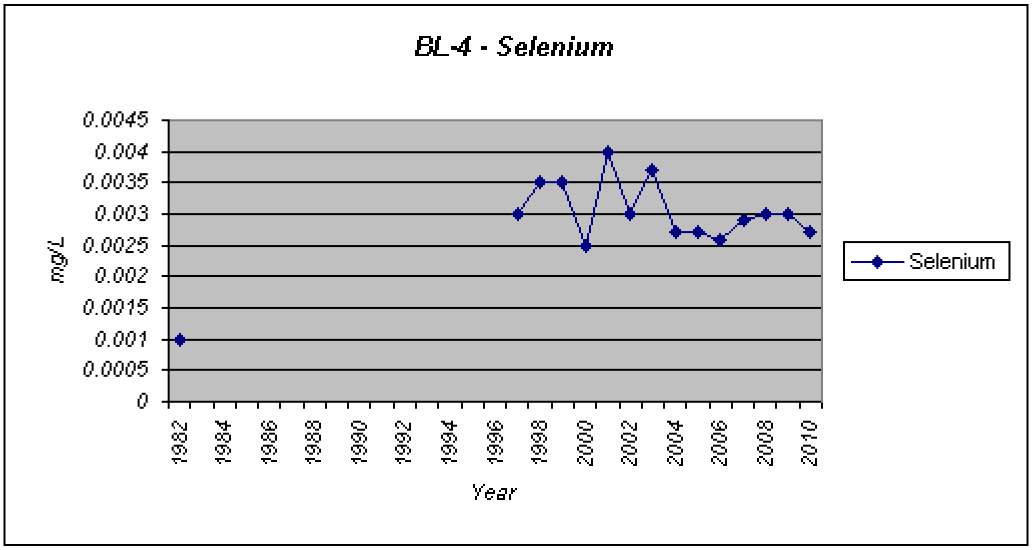


Figure 4.3.49 AN-4 - Martin Lake

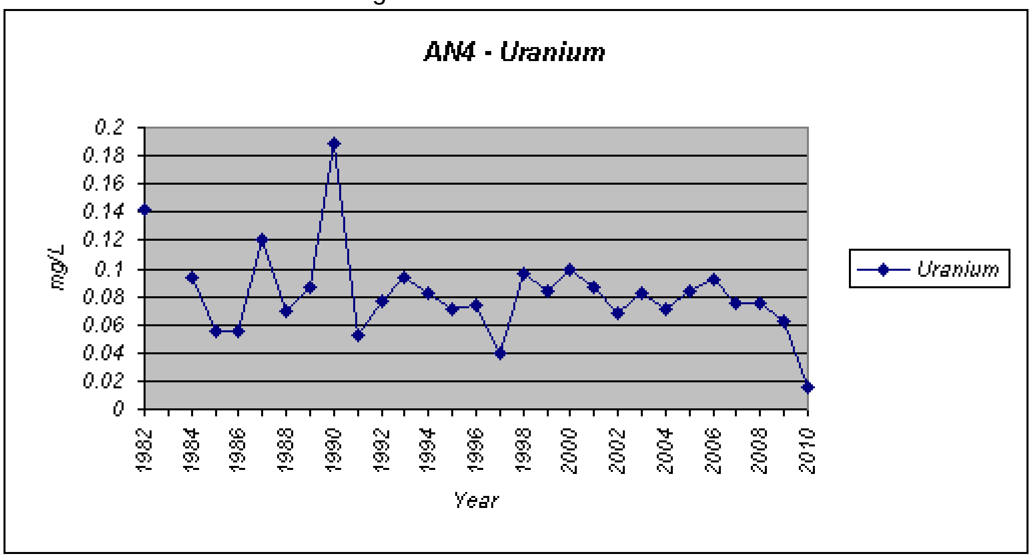


Figure 4.3.50 AN-4 - Martin Lake

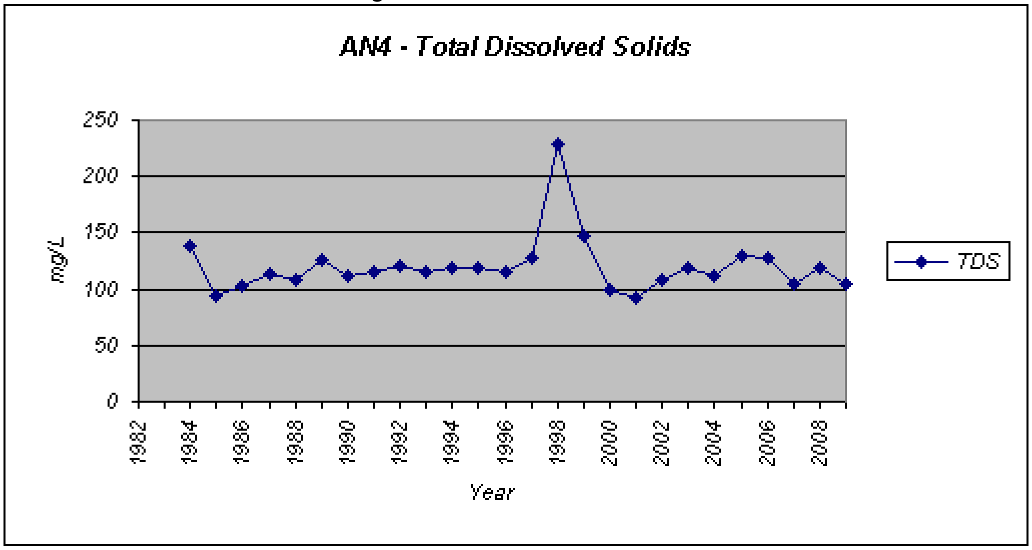


Figure 4.3.51 AN-4 - Martin Lake

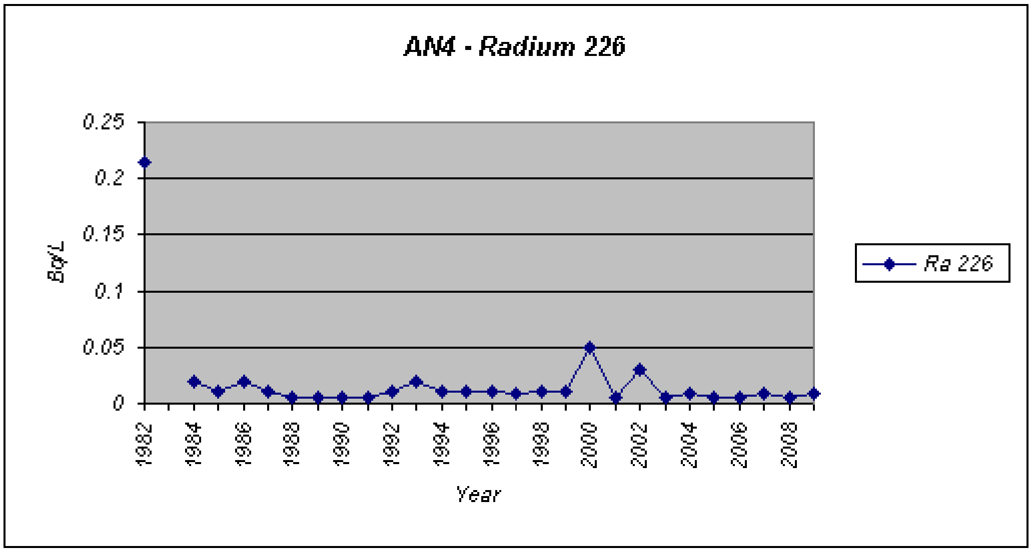


Figure 4.4.1 Total Dissolved Solids Loadings (kg E+06) to Beaverlodge Lake

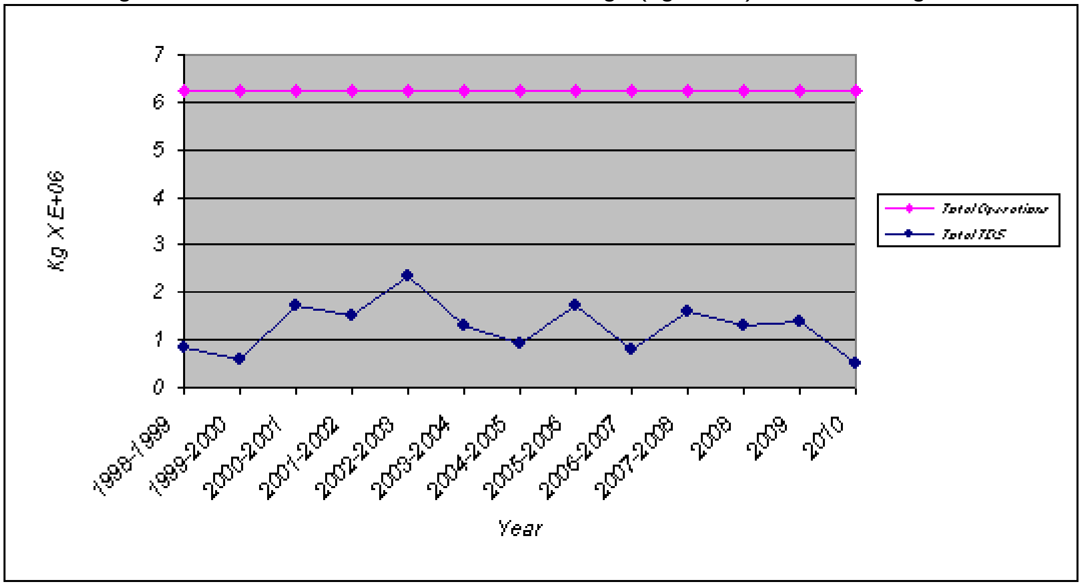


Figure 4.4.2 Total Radium-226 Loadings (Bq E+08) to Beaverlodge Lake

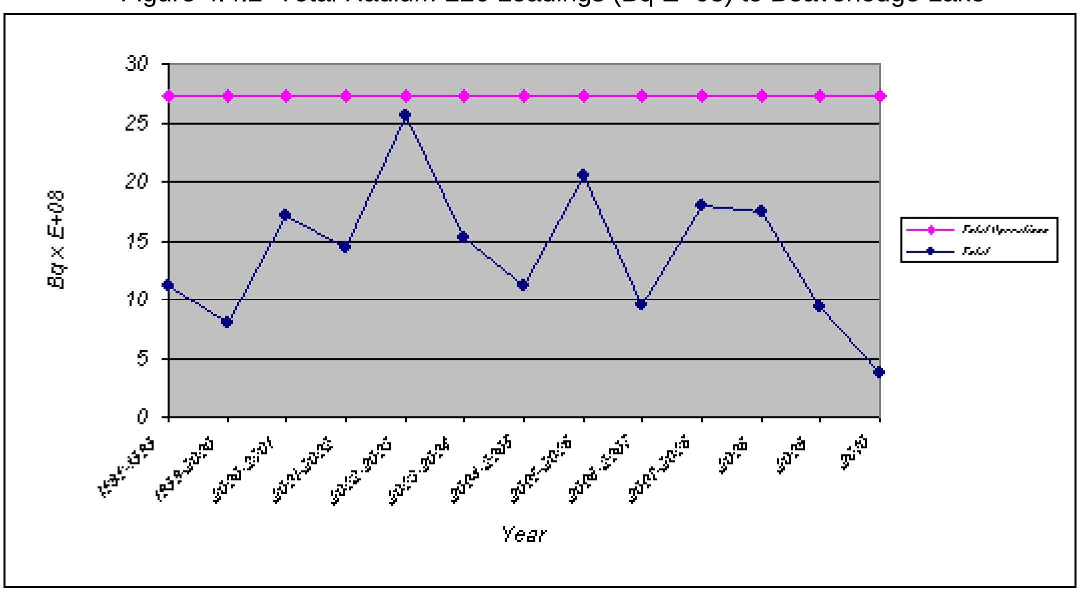


Figure 4.4.3 Total Uranium (kg E+02) to Beaverlodge Lake

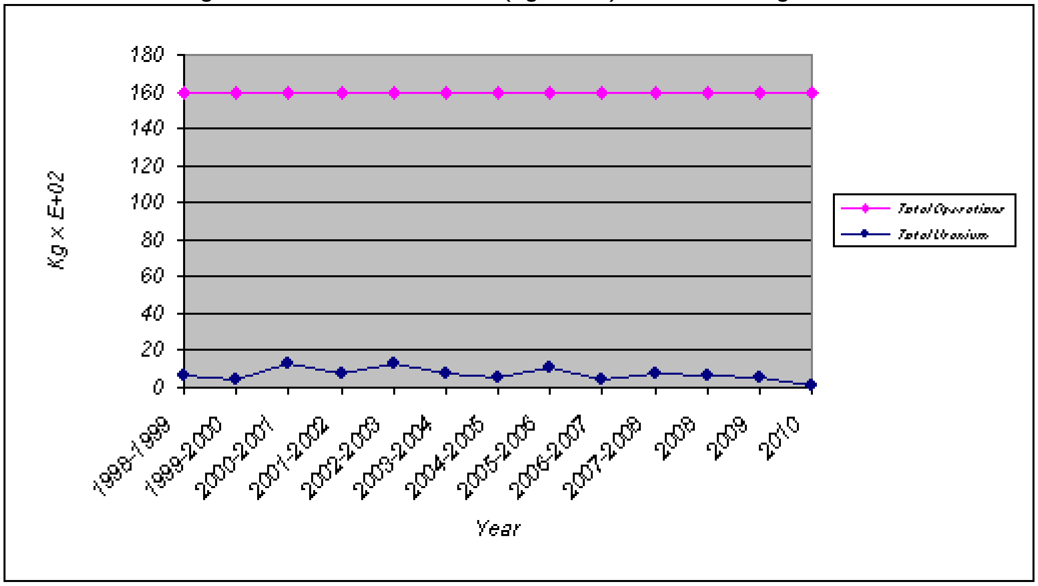
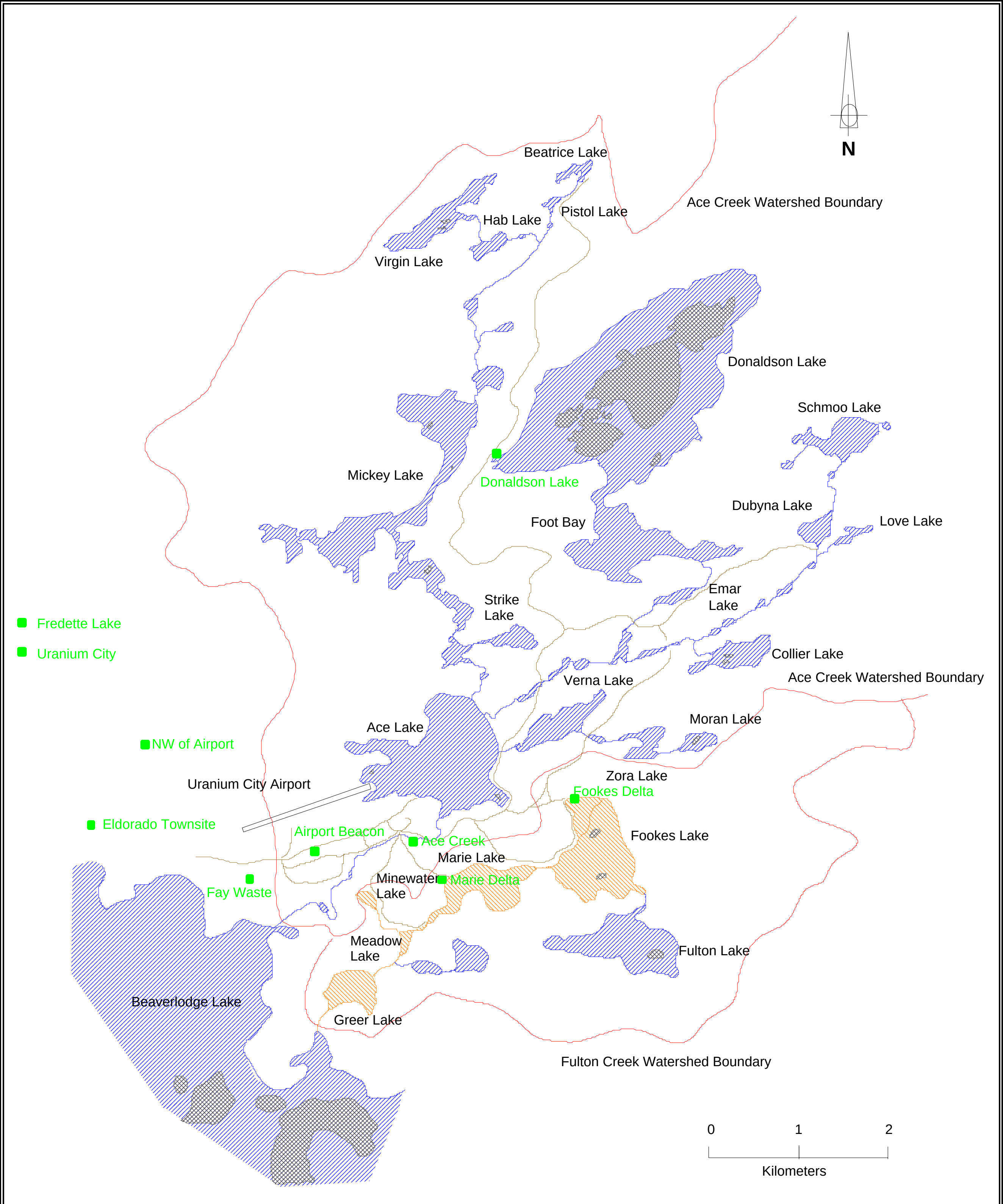
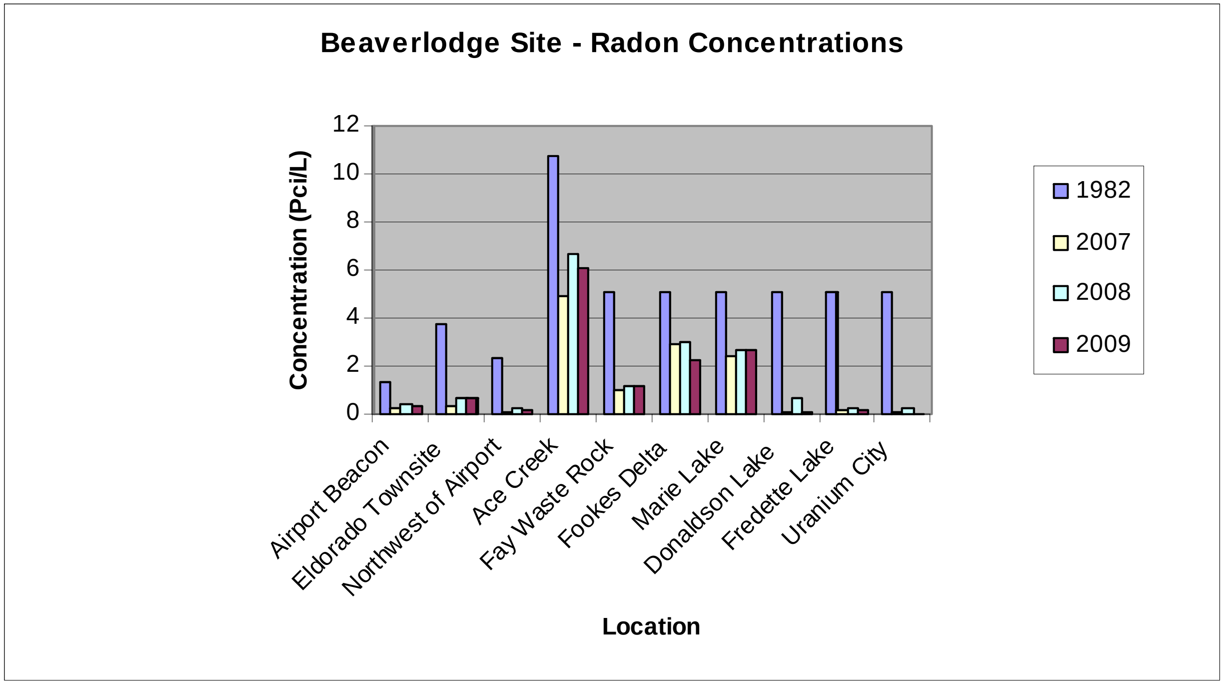


Figure 4.5.1 - Air Sampling Locations



Beavelodge Site - Air Sampling Locations

Figure 4.5.2
Radon Summary (2007 – 2009 versus 1982)



APPENDICES

APPENDICES

APPENDIX A

DETAILED WATER QUALITY RESULTS

Station: AC-14

	2009-Jan	2009-Feb	2009-Mar	2009-Apr	2009-May	2009-Jul	2009-Aug	2009-Sep	2009-Oct	2009-Nov	2009-Dec	2010-Jan	2010-Feb	2010-Mar	2010-Apr	2010-May	2010-Jun
Cond-L (µS/cm)	122	125	123	124	103	109	110	112	114	117	118	117	118	121	103	110	112
pH-L (pH Unit)	7.76	7.83	7.92	7.89	7.69	7.78	7.75	7.87	7.68	7.81	7.77	7.71	7.67	7.82	7.59	7.79	7.84
TSS (mg/L)	1.000	<1.000	<1.000	2.000	<1.000	<1.000	1.500	<1.000	<1.000	4.000	<1.000	<1.000	<1.000	1.000	1.000	<1.000	<1.000
Alk-T (mg/L)	51.0	55.0	54.0	53.0	46.0	51.5	55.5	56.0	49.0	48.0	55.0	50.0	49.0	51.0	44.0	46.0	47.0
Ca (mg/L)	18.0	18.0	18.0	18.0	15.0	15.5	15.5	16.0	16.0	17.0	17.0	17.0	17.0	17.0	14.0	15.0	16.0
Cl (mg/L)	1.20	1.10	1.30	1.90	1.10	1.00	1.00	1.20	1.20	1.20	1.00	1.10	1.20	1.10	1.10	1.20	1.40
CO3 (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Hardness (mg/L)	60	60	59	59	49	51	52	53	52	56	56	56	56	56	46	50	53
HCO3 (mg/L)	62.0	67.0	66.0	65.0	56.0	62.5	67.5	68.0	60.0	59.0	67.0	61.0	60.0	62.0	54.0	56.0	57.0
K (mg/L)	0.3	0.7	0.7	0.7	0.6	0.7	0.7	0.8	0.7	0.9	0.9	0.7	0.9	0.5	0.7	0.6	0.6
Mg (mg/L)	3.6	3.6	3.5	3.4	2.8	3.0	3.0	3.1	3.0	3.2	3.4	3.4	3.4	3.4	2.8	3.0	3.1
Na (mg/L)	1.8	1.8	1.8	2.1	1.5	1.7	1.6	1.8	1.8	1.9	1.7	1.6	1.8	1.9	1.6	1.7	1.8
OH (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
SO4 (mg/L)	7.8	7.6	7.8	8.9	6.5	7.2	7.5	8.0	7.4	7.8	6.9	7.6	7.2	7.2	6.7	7.2	7.2
Sum of Ions (mg/L)	95	100	99	100	84	92	97	99	90	91	98	93	92	93	81	85	87
TDS (mg/L)	70.00	60.00	92.00	78.00	87.00	81.00	71.00	82.00	80.00	70.00	92.00	77.00	86.00	92.00	62.00	86.00	74.00
As (µg/L)	0.1	-	0.2	-	-	0.2	0.2	0.2	-	0.2	-	0.2	0.2	0.2	0.2	0.1	0.2
Ba (mg/L)	-	-	0.025	-	-	-	0.026		-	0.023	-	0.024	0.023	0.025	0.020	0.022	0.022
Cu (mg/L)	<0.001	-	0.001	-	-	0.001	0.002	0.001	-	0.001	-	0.001	0.001	0.001	0.001	0.001	0.001
Fe (mg/L)	0.049	-	0.040	-	-	0.074	0.084	0.068	-	0.092	-	0.047	0.054	0.056	0.038	0.043	0.100
Mo (mg/L)	-	-	-	-	-	-	-	-	-	0.001	-	0.001	0.001	0.001	0.001	0.001	0.001
Ni (mg/L)	<0.00100	-	0.00010	-	-	0.00020	0.00030	0.00020	-	0.00020	-	0.00020	0.00020	0.00010	0.00010	0.00010	0.00020
Pb (mg/L)	<0.0020	-	0.0002	-	-	0.0002	0.0003	0.0002	-	0.0007	-	0.0002	0.0002	0.0001	0.0002	0.0004	0.0002
Se (mg/L)	-	0.0001	-	0.0003	0.0003	<0.0001	0.0001	0.0001	0.0002	<0.0001	<0.0001	0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Zn (mg/L)	<0.005	-	<0.001	-	-	<0.001	0.004	<0.001	-	0.002	-	0.001	0.002	0.001	<0.001	0.001	0.001
NO3 (mg/L)	-	-	-	-	-	-	-	-	-	<0.04	-	0.71	0.35	0.26	<0.04	<0.04	<0.04
P-(TP) (mg/L)	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.01	-	-	<0.01
Pb210 (Bq/L)	0.02	-	<0.02	-	-	<0.02	<0.02	<0.02	-	-	-	-	-	<0.02	-	-	<0.02
Po210 (Bq/L)	0.006	-	0.010	-	-	0.008	0.020	0.010	-	-	-	-	-	0.006	-	-	0.010
Ra226 (Bq/L)	0.040	0.030	0.050	0.050	0.020	0.025	0.045	0.040	0.040	0.030	<0.005	0.020	0.030	0.030	0.030	0.040	0.040
U (µg/L)	24.0	22.0	23.0	37.0	23.0	23.0	23.5	25.0	26.0	23.0	14.0	19.0	16.0	16.0	23.0	22.0	21.0
C-(org) (mg/L)	-	-	-	-	-	-	-	-	-	-	-	-	-	8.000	-	-	7.600

Station: AC-8

	2009-Feb	2009-May	2009-Aug	2009-Sep	2009-Nov	2010-Mar	2010-Jun
Cond-L (µS/cm)	126	98	104	103	113	120	108
pH-L (pH Unit)	7.74	7.57	7.80	7.85	7.47	7.67	7.78
TSS (mg/L)	<1.000	<1.000	<1.000	<1.000	3.000	1.000	<1.000
Alk-T (mg/L)	56.0	47.0	50.0	51.0	48.0	51.0	46.0
Ca (mg/L)	18.0	14.0	15.0	15.0	16.0	17.0	15.0
Cl (mg/L)	1.10	0.90	0.80	0.90	0.90	1.10	1.00
CO3 (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Hardness (mg/L)	60	46	49	50	53	56	50
HCO3 (mg/L)	68.0	57.0	61.0	62.0	59.0	62.0	56.0
K (mg/L)	0.4	0.6	0.7	0.7	0.7	0.8	0.7
Mg (mg/L)	3.6	2.7	2.9	3.0	3.2	3.4	3.0
Na (mg/L)	1.7	1.3	1.4	1.3	1.6	1.8	1.4
OH (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
SO4 (mg/L)	7.7	5.3	6.4	6.3	7.0	6.7	6.3
Sum of Ions (mg/L)	101	82	88	89	88	93	83
TDS (mg/L)	82.00	70.00	71.00	72.00	70.00	88.00	71.00
As (µg/L)	-	-	0.1	-	0.1	0.2	0.1
Ba (mg/L)	-	-	0.023	-	0.022	0.024	0.020
Cu (mg/L)	-	-	0.001	-	0.001	0.001	0.000
Fe (mg/L)	-	-	0.020	-	0.034	0.059	0.013
Mo (mg/L)	-	-		-	0.001	0.001	0.001
Ni (mg/L)	-	-	0.00020	-	0.00010	0.00020	0.00010
Pb (mg/L)	-	-	<0.0001	-	<0.0001	<0.0001	<0.0001
Se (mg/L)	-	-	0.0001	<0.0001	<0.0001	0.0001	<0.0001
Zn (mg/L)	-	-	<0.001	-	0.001	0.002	<0.001
NO3 (mg/L)	-	-	-	-	<0.04	0.22	<0.04
P-(TP) (mg/L)	-	-	-	-	-	<0.01	-
Pb210 (Bq/L)	-	-	<0.02	-	-	<0.02	-
Po210 (Bq/L)	-	-	<0.005	-	-	0.005	-
Ra226 (Bq/L)	0.010	0.020	0.010	0.020	0.010	0.020	0.008
U (µg/L)	19.0	13.0	14.0	12.0	15.0	12.0	14.0
C-(org) (mg/L)	-	-	-	-	-	8.100	-

Station: AN-3

	2009-Jul
Cond-L (µS/cm)	136
pH-L (pH Unit)	7.88
TSS (mg/L)	1.000
Alk-T (mg/L)	69.0
Ca (mg/L)	20.0
Cl (mg/L)	0.60
CO3 (mg/L)	<1.0
Hardness (mg/L)	68
HCO3 (mg/L)	84.0
K (mg/L)	0.8
Mg (mg/L)	4.5
Na (mg/L)	1.8
OH (mg/L)	<1.0
SO4 (mg/L)	4.3
Sum of Ions (mg/L)	116
TDS (mg/L)	89.00
As (µg/L)	0.1
Cu (mg/L)	0.001
Fe (mg/L)	0.013
Ni (mg/L)	0.00010
Pb (mg/L)	<0.0001
Se (mg/L)	<0.0001
Zn (mg/L)	<0.001
Pb210 (Bq/L)	<0.02
Po210 (Bq/L)	0.006
Ra226 (Bq/L)	<0.005
U (µg/L)	1.6

Station: AN-4

	2009-Jul	2010-Mar
Cond-L (µS/cm)	169	154
pH-L (pH Unit)	7.87	7.93
TSS (mg/L)	<1.000	2.000
Alk-T (mg/L)	64.0	64.0
Ca (mg/L)	18.0	21.0
Cl (mg/L)	6.90	3.10
CO3 (mg/L)	<1.0	<1.0
Hardness (mg/L)	61	69
HCO3 (mg/L)	78.0	78.0
K (mg/L)	1.0	1.1
Mg (mg/L)	4.0	4.1
Na (mg/L)	10.0	4.5
OH (mg/L)	<1.0	<1.0
SO4 (mg/L)	16.0	7.9
Sum of Ions (mg/L)	134	120
TDS (mg/L)	105.00	113.00
As (µg/L)	-	0.2
Ba (mg/L)	-	0.046
Cu (mg/L)	-	0.001
Fe (mg/L)	-	0.028
Mo (mg/L)	-	0.001
Ni (mg/L)	-	0.00020
Pb (mg/L)	-	0.0003
Se (mg/L)	-	0.0004
Zn (mg/L)	-	0.004
NO3 (mg/L)	-	0.09
P-(TP) (mg/L)	-	0.03
Pb210 (Bq/L)	-	<0.02
Po210 (Bq/L)	-	<0.005
Ra226 (Bq/L)	0.009	0.010
U (µg/L)	63.0	15.0
C-(org) (mg/L)	-	11.000

Station: AN-5

	2009-Apr	2009-Jul	2009-Aug	2009-Oct	2009-Dec	2010-Jan	2010-Mar	2010-May
Cond-L (µS/cm)	182	200	224	231	138	365	423	222
pH-L (pH Unit)	7.69	7.79	7.58	7.57	7.66	7.43	7.49	7.79
TSS (mg/L)	2.000	<1.000	5.000	<1.000	<1.000	6.000	3.000	<1.000
Alk-T (mg/L)	78.0	85.0	116.0	100.0	62.0	175.0	208.0	95.0
Ca (mg/L)	26.0	28.0	32.0	32.0	17.0	51.0	58.0	30.0
Cl (mg/L)	0.80	0.70	0.80	1.00	0.40	2.00	3.00	1.00
CO3 (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Hardness (mg/L)	90	96	111	111	66	177	202	104
HCO3 (mg/L)	95.0	104.0	142.0	122.0	76.0	214.0	254.0	116.0
K (mg/L)	1.4	1.2	1.7	1.5	1.0	2.3	2.7	1.4
Mg (mg/L)	6.0	6.4	7.5	7.7	5.8	12.0	14.0	7.2
Na (mg/L)	3.2	3.3	3.8	4.1	1.6	6.9	8.5	4.0
OH (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
SO4 (mg/L)	16.0	17.0	9.5	20.0	10.0	18.0	17.0	18.0
Sum of Ions (mg/L)	148	161	197	188	112	306	357	178
TDS (mg/L)	129.00	144.00	143.00	162.00	105.00	230.00	279.00	155.00
As (µg/L)	-	0.4	-	0.3	-	0.7	0.6	0.3
Ba (mg/L)	-	0.130	-	0.100	-	0.220	0.250	0.110
Cu (mg/L)	-	0.001	-	0.001	-	0.001	0.000	0.002
Fe (mg/L)	-	0.240	-	0.120	-	1.470	1.090	0.082
Mo (mg/L)	-		-		-	0.001	0.001	0.004
Ni (mg/L)	-	0.00060	-	0.00050	-	0.00070	0.00060	0.00050
Pb (mg/L)	-	0.0001	-	<0.0001	-	0.0002	<0.0001	0.0012
Se (mg/L)	0.0003	-	0.0001	0.0003	<0.0001	<0.0001	<0.0001	<0.0001
Zn (mg/L)	-	0.001	-	0.001	-	0.002	0.001	0.003
NO3 (mg/L)	-	-	-	-	-	<0.04	<0.04	<0.04
P-(TP) (mg/L)	-	-	-	-	-	-	0.04	-
Pb210 (Bq/L)	-	<0.02	-	0.03	-	-	0.10	-
Po210 (Bq/L)	-	0.030	-	0.010	-	-	0.060	-
Ra226 (Bq/L)	0.520	0.740	1.300	0.490	-	1.900	1.900	0.530
U (µg/L)	139.0	53.0	46.0	198.0	-	212.0	191.0	146.0
C-(org) (mg/L)	-	-	-	-	-	-	13.000	-

Station: BL-3

	2009-Jan	2009-Mar	2009-Jul	2009-Oct	2010-Mar	2010-Jun
Cond-L (µS/cm)	273	263	235	239	263	242
pH-L (pH Unit)	8.04	8.06	7.90	7.87	7.98	7.93
TSS (mg/L)	<1.000	<1.000	<1.000	<1.000	1.000	<1.000
Alk-T (mg/L)	79.0	80.0	68.0	70.0	75.0	67.0
Ca (mg/L)	25.0	24.0	21.0	20.0	23.0	21.0
Cl (mg/L)	16.00	15.00	13.00	13.00	14.00	13.00
CO3 (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Hardness (mg/L)	87	84	73	70	81	74
HCO3 (mg/L)	96.0	98.0	83.0	85.0	92.0	82.0
K (mg/L)	0.8	1.7	1.1	1.1	1.2	1.0
Mg (mg/L)	6.1	5.8	5.1	5.0	5.7	5.3
Na (mg/L)	22.0	22.0	19.0	19.0	20.0	19.0
OH (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
SO4 (mg/L)	38.0	35.0	32.0	32.0	34.0	32.0
Sum of Ions (mg/L)	204	202	174	175	190	173
TDS (mg/L)	156.00	157.00	141.00	151.00	160.00	147.00
As (µg/L)	0.3	0.3	0.3	0.2	1.1	0.2
Ba (mg/L)	-	-	-	-	0.052	0.033
Cu (mg/L)	0.002	0.002	0.002	0.001	0.002	0.001
Fe (mg/L)	0.008	0.016	0.007	0.009	0.011	0.004
Mo (mg/L)					0.004	0.003
Ni (mg/L)	0.00200	0.00130	0.00270	0.00110	0.00290	0.00190
Pb (mg/L)	<0.0020	0.0002	0.0001	<0.0001	0.0003	0.0001
Se (mg/L)	0.0032	0.0032	0.0029	0.0030	0.0032	0.0027
Zn (mg/L)	<0.005	0.004	0.003	0.004	0.005	0.006
NO3 (mg/L)	-	-	-	-	<0.04	<0.04
P-(TP) (mg/L)	-	-	-	-	0.02	<0.01
Pb210 (Bq/L)	<0.02	<0.02	<0.02	0.02	<0.02	<0.02
Po210 (Bq/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Ra226 (Bq/L)	0.030	0.080	0.060	0.040	0.070	0.030
U (µg/L)	171.0	154.0	144.0	139.0	151.0	135.0
C-(org) (mg/L)	-	-	-	-	4.500	2.700

Station: BL-4

	2009-Jan	2009-Mar	2009-Jul	2009-Oct	2010-Mar	2010-Jun
Cond-L (µS/cm)	250	252	232	240	256	240
pH-L (pH Unit)	8.11	8.06	7.87	7.87	8.08	7.94
TSS (mg/L)	<1.000	1.000	<1.000	<1.000	<1.000	<1.000
Alk-T (mg/L)	74.0	73.0	68.0	69.0	71.0	67.0
Ca (mg/L)	22.0	22.0	21.0	20.0	22.0	21.0
Cl (mg/L)	14.00	14.00	13.00	13.00	14.00	13.00
CO3 (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Hardness (mg/L)	77	77	73	71	77	74
HCO3 (mg/L)	90.0	89.0	83.0	84.0	87.0	82.0
K (mg/L)	1.3	1.2	1.1	1.2	1.1	1.1
Mg (mg/L)	5.5	5.4	5.0	5.1	5.4	5.3
Na (mg/L)	21.0	20.0	18.0	19.0	20.0	19.0
OH (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
SO4 (mg/L)	33.0	34.0	32.0	32.0	34.0	32.0
Sum of Ions (mg/L)	187	186	173	174	184	173
TDS (mg/L)	139.00	147.00	135.00	147.00	158.00	146.00
As (µg/L)	0.3	0.3	0.2	0.3	0.3	0.2
Ba (mg/L)	-	-	-	-	0.037	0.032
Cu (mg/L)	0.003	0.002	0.002	0.001	0.001	0.001
Fe (mg/L)	0.008	0.031	0.010	0.007	0.013	0.004
Mo (mg/L)					0.004	0.003
Ni (mg/L)	0.00400	0.00170	0.00300	0.00070	0.00100	0.00170
Pb (mg/L)	<0.0020	0.0003	0.0001	<0.0001	0.0002	<0.0001
Se (mg/L)	0.0031	0.0032	0.0027	0.0031	0.0027	0.0026
Zn (mg/L)	<0.005	0.014	0.003	0.001	0.007	0.004
NO3 (mg/L)	-	-	-	-	0.09	<0.04
P-(TP) (mg/L)	-	-	-	-	0.02	<0.01
Pb210 (Bq/L)	<0.02	<0.02	<0.02	<0.02	0.04	<0.02
Po210 (Bq/L)	0.006	<0.005	<0.005	<0.005	<0.005	<0.005
Ra226 (Bq/L)	0.020	0.030	0.020	0.030	0.040	0.040
U (µg/L)	155.0	143.0	139.0	138.0	151.0	133.0
C-(org) (mg/L)	-	-	-	-	3.400	3.200

Station: DB-6

	2009-Feb	2009-Apr	2009-Jul	2009-Aug	2009-Oct	2009-Dec	2010-Jan	2010-May
Cond-L (µS/cm)	248	173	207	208	226	244	244	210
pH-L (pH Unit)	7.81	7.71	7.96	7.87	7.85	7.91	7.73	7.80
TSS (mg/L)	<1.000	1.000	<1.000	1.000	<1.000	<1.000	<1.000	<1.000
Alk-T (mg/L)	94.0	67.0	79.0	90.0	87.0	96.0	92.0	80.0
Ca (mg/L)	39.0	28.0	33.0	34.0	36.0	39.0	39.0	33.0
Cl (mg/L)	0.80	0.80	0.60	0.40	0.60	0.70	0.70	0.60
CO3 (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Hardness (mg/L)	123	85	103	106	113	122	122	104
HCO3 (mg/L)	115.0	82.0	96.0	110.0	106.0	117.0	112.0	98.0
K (mg/L)	0.7	1.8	0.8	0.8	0.8	0.9	0.8	0.8
Mg (mg/L)	6.3	3.7	5.1	5.2	5.6	6.1	6.1	5.2
Na (mg/L)	2.5	1.4	1.9	1.9	2.2	2.4	1.9	2.0
OH (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
SO4 (mg/L)	31.0	18.0	24.0	24.0	27.0	29.0	29.0	26.0
Sum of Ions (mg/L)	195	136	161	176	178	195	190	166
TDS (mg/L)	163.00	112.00	149.00	138.00	159.00	181.00	162.00	154.00
As (µg/L)	0.2	-	<0.1	-	0.1	-	0.2	0.1
Ba (mg/L)	0.055	-	0.042	-	0.044	-	0.049	0.039
Cu (mg/L)	0.001	-	0.001	-	0.001	-	0.001	0.001
Fe (mg/L)	0.036	-	0.014	-	0.011	-	0.015	0.007
Mo (mg/L)	-	-	-	-	-	-	0.002	0.002
Ni (mg/L)	0.00030	-	0.00020	-	0.00020	-	0.00020	0.00020
Pb (mg/L)	0.0001	-	<0.0001	-	<0.0001	-	<0.0001	<0.0001
Se (mg/L)	-	0.0003	-	0.0001	0.0001	0.0003	<0.0001	<0.0001
Zn (mg/L)	0.001	-	0.001	-	0.001	-	0.001	<0.001
NO3 (mg/L)	-	-	-	-	-	-	0.53	0.09
Pb210 (Bq/L)	0.02	-	<0.02	-	0.02	-	-	-
Po210 (Bq/L)	0.020	-	0.010	-	0.010	-	-	-
Ra226 (Bq/L)	0.030	0.030	0.040	0.030	0.040	0.040	0.030	0.030
U (µg/L)	335.0	65.0	192.0	196.0	260.0	245.0	261.0	208.0

Station: TL-3

	2009-Jan	2009-Feb	2009-Mar	2009-Apr	2009-May	2009-Jul	2009-Aug	2009-Sep	2009-Oct	2009-Nov	2009-Dec	2010-Jan	2010-Feb	2010-Mar	2010-Apr	2010-May
Cond-L (µS/cm)	386	384	376	343	312	316	332	329	352	372	376	354	364	375	233	344
pH-L (pH Unit)	8.20	8.15	8.23	8.16	8.02	8.22	8.27	8.27	8.00	8.21	8.15	8.03	7.99	8.21	7.94	8.22
TSS (mg/L)	1.000	<1.000	2.000	2.000	<1.000	<1.000	<1.000	<1.000	<1.000	3.000	2.000	<1.000	<1.000	1.000	1.000	<1.000
Alk-T (mg/L)	148.0	146.0	148.0	131.0	118.0	124.0	130.0	132.0	136.0	137.0	147.0	139.0	141.0	148.0	86.0	131.0
Ca (mg/L)	29.0	29.0	29.0	27.0	24.0	22.5	25.0	25.0	25.0	28.0	28.0	30.0	31.0	31.0	17.0	26.0
Cl (mg/L)	5.00	5.00	4.00	4.00	3.00	4.00	4.00	4.00	4.00	4.00	5.00	4.00	4.00	4.00	2.20	4.00
CO3 (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Hardness (mg/L)	94	95	95	88	78	76	83	83	82	91	92	99	102	102	55	85
HCO3 (mg/L)	181.0	178.0	181.0	160.0	144.0	151.5	159.0	161.0	166.0	167.0	179.0	170.0	172.0	181.0	105.0	160.0
K (mg/L)	1.1	1.8	1.4	1.0	1.1	1.3	1.2	2.7	1.2	1.3	1.4	1.4	1.4	1.4	0.8	1.2
Mg (mg/L)	5.3	5.4	5.4	5.0	4.4	4.8	5.1	5.0	4.7	5.2	5.5	5.9	6.1	6.1	3.1	4.9
Na (mg/L)	46.0	46.0	48.0	42.0	38.0	40.0	41.0	41.0	40.0	44.0	45.0	37.0	38.0	40.0	27.0	41.0
OH (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
SO4 (mg/L)	50.0	50.0	49.0	46.0	40.0	38.5	42.0	42.0	41.0	47.0	46.0	38.0	41.0	42.0	27.0	43.0
Sum of Ions (mg/L)	317	315	318	285	255	263	277	281	282	297	310	286	294	306	182	280
TDS (mg/L)	230.00	235.00	251.00	211.00	204.00	202.50	201.00	214.00	223.00	224.00	245.00	216.00	232.00	247.00	137.00	221.00
As (µg/L)	-	-	-	-	-	-	-	-	-	1.1	-	1.0	1.0	1.0	0.7	1.0
Ba (mg/L)	0.037	0.038	0.036	0.030	0.030	0.046	0.033	0.035	0.034	0.035	0.038	0.037	0.036	0.039	0.023	0.033
Cu (mg/L)	-	-	-	-	-	-	-	-	-	0.001	-	0.001	0.001	0.001	0.001	0.001
Fe (mg/L)	-	-	-	-	-	-	-	-	-	0.008	-	0.005	0.004	0.004	0.008	0.010
Mo (mg/L)	-	-	-	-	-	-	-	-	-	0.019	-	0.016	0.016	0.016	0.011	0.016
Ni (mg/L)	-	-	-	-	-	-	-	-	-	0.00040	-	0.00030	0.00030	0.00030	0.00020	0.00030
Pb (mg/L)	-	-	-	-	-	-	-	-	-	0.0006	-	0.0003	0.0002	0.0003	0.0004	0.0008
Se (mg/L)	-	-	-	-	-	-	-	0.0039	0.0044	0.0044	0.0046	0.0039	0.0040	0.0043	0.0025	0.0039
Zn (mg/L)	-	-	-	-	-	-	-	-	-	0.001	-	0.001	<0.001	0.002	<0.001	<0.001
NO3 (mg/L)	-	-	-	-	-	-	-	-	-	<0.04	-	0.13	0.18	0.09	<0.04	<0.04
P-(TP) (mg/L)	-	-	-	-	-	-	-	-	-	-	-	-	-	0.03	-	-
Pb210 (Bq/L)	-	-	-	-	-	-	-	-	-	-	-	-	-	0.07	-	-
Po210 (Bq/L)	-	-	-	-	-	-	-	-	-	-	-	-	-	0.040	-	-
Ra226 (Bq/L)	1.200	1.200	1.200	1.400	0.980	1.250	1.100	1.200	1.200	1.200	1.200	1.200	1.000	1.200	0.750	1.200
U (µg/L)	461.0	461.0	438.0	371.0	345.0	324.5	377.0	372.0	399.0	423.0	431.0	353.0	359.0	386.0	246.0	365.0
C-(org) (mg/L)	-	-	-	-	-	-	-	-	-	-	-	-	-	9.500	-	-

Station: TL-4

	2009-Jan	2009-Feb	2009-Mar	2009-Apr	2009-May	2009-Jul	2009-Aug	2009-Sep	2009-Oct	2009-Nov	2010-Jan	2010-Feb	2010-Mar	2010-Apr	2010-May
Cond-L (µS/cm)	380	388	388	353	306	308	314	322	335	354	383	395	403	272	328
pH-L (pH Unit)	8.18	8.16	8.20	8.10	8.04	8.21	8.15	8.10	7.91	8.17	8.09	7.77	8.16	7.96	8.05
TSS (mg/L)	1.000	<1.000	<1.000	<1.000	<1.000	1.500	<1.000	1.000	<1.000	3.000	<1.000	<1.000	1.000	<1.000	1.000
Alk-T (mg/L)	152.0	151.0	158.0	138.0	124.0	125.0	125.0	128.0	133.0	134.0	151.0	155.0	161.0	110.0	131.0
Ca (mg/L)	24.0	25.0	26.0	24.0	22.0	19.0	19.0	20.0	22.0	22.0	25.0	27.0	27.0	20.0	22.0
Cl (mg/L)	5.00	5.00	5.00	4.00	3.00	4.00	4.00	4.00	4.00	4.00	5.00	4.00	4.00	2.60	4.00
CO3 (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Hardness (mg/L)	83	87	89	82	73	67	68	70	75	76	86	91	92	66	75
HCO3 (mg/L)	185.0	184.0	193.0	168.0	151.0	150.5	153.0	156.0	162.0	163.0	184.0	189.0	196.0	134.0	160.0
K (mg/L)	1.4	2.0	1.6	1.5	1.3	1.3	1.3	2.3	1.4	1.4	1.4	1.6	1.6	1.0	1.2
Mg (mg/L)	5.7	5.9	5.9	5.3	4.5	4.8	5.0	5.0	5.0	5.2	5.7	5.8	6.0	3.9	4.9
Na (mg/L)	50.0	51.0	52.0	46.0	40.0	41.5	44.0	43.0	43.0	45.0	47.0	50.0	50.0	32.0	42.0
OH (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
SO4 (mg/L)	47.0	47.0	45.0	41.0	34.0	36.0	37.0	37.0	37.0	40.0	43.0	44.0	44.0	27.0	36.0
Sum of Ions (mg/L)	318	320	329	290	256	262	263	267	274	281	311	321	329	221	270
TDS (mg/L)	238.00	233.00	356.00	213.00	212.00	200.50	210.00	206.00	216.00	215.00	236.00	249.00	265.00	168.00	219.00
As (µg/L)	-	-	-	-	-	-	-	-	-	1.7	1.9	1.7	1.8	1.1	1.3
Ba (mg/L)	0.073	0.075	0.072	0.072	0.063	0.059	0.059	0.064	0.066	0.067	0.076	0.074	0.079	0.062	0.073
Cu (mg/L)	-	-	-	-	-	-	-	-	-	0.001	0.001	0.001	0.001	0.001	0.001
Fe (mg/L)	-	-	-	-	-	-	-	-	-	0.028	0.015	0.010	0.017	0.042	0.062
Mo (mg/L)	-	-	-	-	-	-	-	-	-	0.014	0.015	0.014	0.015	0.011	0.012
Ni (mg/L)	-	-	-	-	-	-	-	-	-	0.00060	0.00070	0.00060	0.00070	0.00040	0.00050
Pb (mg/L)	-	-	-	-	-	-	-	-	-	0.0008	0.0008	0.0005	0.0004	0.0004	0.0003
Se (mg/L)		0.0032	-	-	-	-	-	0.0020	0.0026	0.0024	0.0031	0.0028	0.0033	0.0022	0.0024
Zn (mg/L)	-	-	-	-	-	-	-	-	-	<0.001	0.001	<0.001	0.001	<0.001	<0.001
NO3 (mg/L)	-	-	-	-	-	-	-	-	-	<0.04	<0.04	<0.04	0.04	<0.04	0.09
P-(TP) (mg/L)	-	-	-	-	-	-	-	-	-	-	-	-	0.03	-	-
Pb210 (Bq/L)	-	-	-	-	-	-	-	-	-	-	-	-	0.20	-	-
Po210 (Bq/L)	-	-	-	-	-	-	-	-	-	-	-	-	0.080	-	-
Ra226 (Bq/L)	1.700	1.700	2.100	1.400	1.600	1.450	1.300	1.600	1.600	1.500	1.800	1.700	1.800	1.500	1.500
U (µg/L)	407.0	409.0	390.0	389.0	304.0	281.5	308.0	318.0	341.0	361.0	409.0	397.0	410.0	266.0	299.0
C-(org) (mg/L)	-	-	-	-	-	-	-	-	-	-	-	-	10.000	-	-

Station: TL-6

	2009-May	2009-Aug	2010-May
Cond-L (µS/cm)	650	880	791
pH-L (pH Unit)	7.93	7.95	7.94
TSS (mg/L)	<1.000	9.000	2.000
Alk-T (mg/L)	245.0	334.0	306.0
Ca (mg/L)	42.0	52.0	46.0
Cl (mg/L)	45.00	67.00	54.00
CO3 (mg/L)	<1.0	<1.0	<1.0
Hardness (mg/L)	142	187	160
HCO3 (mg/L)	299.0	407.0	373.0
K (mg/L)	2.6	2.9	3.1
Mg (mg/L)	9.1	14.0	11.0
Na (mg/L)	92.0	129.0	118.0
OH (mg/L)	<1.0	<1.0	<1.0
SO4 (mg/L)	40.0	47.0	41.0
Sum of Ions (mg/L)	530	719	646
TDS (mg/L)	448.00	604.00	529.00
As (µg/L)	-	-	1.2
Ba (mg/L)	0.960	1.320	1.160
Cu (mg/L)	-	-	0.000
Fe (mg/L)	-	-	0.710
Mo (mg/L)	-	-	0.002
Ni (mg/L)	-	-	0.00030
Pb (mg/L)	-	-	0.0001
Se (mg/L)	0.0024	0.0023	0.0022
Zn (mg/L)	-	-	0.001
NO3 (mg/L)	-	-	0.04
Ra226 (Bq/L)	4.700	6.400	5.600
U (µg/L)	297.0	123.0	248.0

Station: TL-7

	2009-Jan	2009-Feb	2009-Mar	2009-Apr	2009-May	2009-Jul	2009-Aug	2009-Sep	2009-Oct	2009-Nov	2010-Jan	2010-Feb	2010-Mar	2010-Apr	2010-May	2010-Jun
Cond-L (µS/cm)	421	402	393	363	246	328	324	336	371	365	463	437	502	226	324	366
pH-L (pH Unit)	7.98	8.08	8.13	8.02	7.86	8.04	8.00	8.08	7.75	8.06	8.14	7.50	7.92	7.81	7.87	8.22
TSS (mg/L)	1.000	2.000	2.000	1.000	<1.000	<1.000	2.000	<1.000	<1.000	2.000	<1.000	<1.000	4.000	1.000	1.000	<1.000
Alk-T (mg/L)	163.0	157.0	161.0	142.0	101.0	129.5	139.0	136.0	145.0	138.0	183.0	172.0	208.0	93.0	130.0	152.0
Ca (mg/L)	27.0	27.0	27.0	25.0	19.0	21.0	21.0	22.0	25.0	24.0	30.0	29.0	37.0	18.0	23.0	27.0
Cl (mg/L)	7.00	5.00	5.00	5.00	2.80	6.50	5.00	5.00	10.00	6.00	6.00	5.00	7.00	3.60	5.00	7.00
CO3 (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Hardness (mg/L)	92	93	92	85	63	74	74	77	87	83	103	99	125	60	79	92
HCO3 (mg/L)	199.0	192.0	196.0	173.0	123.0	158.0	170.0	166.0	177.0	168.0	223.0	210.0	254.0	113.0	159.0	185.0
K (mg/L)	1.7	2.0	1.6	1.4	1.0	1.3	1.2	2.1	1.4	1.4	2.1	1.7	2.0	0.8	1.2	0.7
Mg (mg/L)	6.1	6.2	6.0	5.5	3.7	5.3	5.2	5.4	5.9	5.6	6.9	6.5	8.0	3.7	5.2	6.0
Na (mg/L)	59.0	52.0	52.0	46.0	30.0	42.0	45.0	43.0	45.0	45.0	64.0	61.0	66.0	23.0	38.0	45.0
OH (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
SO4 (mg/L)	51.0	48.0	46.0	42.0	25.0	35.5	35.0	35.0	38.0	40.0	53.0	49.0	50.0	17.0	31.0	32.0
Sum of Ions (mg/L)	351	332	334	298	205	270	282	279	302	290	385	362	424	179	263	303
TDS (mg/L)	246.00	238.00	259.00	228.00	157.00	213.50	219.00	212.00	235.00	221.00	291.00	278.00	328.00	144.00	218.00	238.00
As (µg/L)	1.6	-	1.6	-	-	1.6	-	1.2	-	1.4	2.3	1.7	1.0	1.5	1.5	1.5
Ba (mg/L)	0.120	0.120	0.120	0.130	0.110	0.155	0.210	0.220	0.260	0.180	0.095	0.100	0.810	0.200	0.320	0.640
Cu (mg/L)	0.002	-	0.001	-	-	0.001	-	0.001		0.001	0.001	0.001	0.002	0.001	0.001	0.001
Fe (mg/L)	0.040	-	0.038	-	-	0.092	-	0.058	-	0.047	0.013	0.120	0.800	0.290	0.130	0.100
Mo (mg/L)	-	-	-	-	-	-	-	-	-	0.013	0.019	0.017	0.011	0.007	0.011	0.007
Ni (mg/L)	<0.00100	-	0.00060	-	-	0.00050	-	0.00050	-	0.00060	0.00090	0.00070	0.00080	0.00040	0.00050	0.00060
Pb (mg/L)	<0.0020	-	0.0004	-	-	0.0004	-	0.0002	-	0.0006	0.0007	0.0005	0.0006	0.0007	0.0005	0.0002
Se (mg/L)	-	0.0029	-	0.0029	0.0024	0.0021	0.0021	0.0020	0.0025	0.0022	0.0039	0.0031	0.0019	0.0017	0.0032	0.0032
Zn (mg/L)	<0.005	-	<0.001	-	-	<0.001	-	<0.001	-	<0.001	0.001	<0.001	0.005	0.001	<0.001	0.001
NO3 (mg/L)	-	-	-	-	-	-	-	-	-	<0.04	0.09	<0.04	<0.04	<0.04	0.13	<0.04
P-(TP) (mg/L)	-	-	-	-	-	-	-	-	-	-	-	-	0.03	-	-	<0.01
Pb210 (Bq/L)	0.06	-	0.09	-	-	0.05	-	0.04	-	-	-	-	0.17	-	-	<0.02
Po210 (Bq/L)	0.050	-	0.050	-	-	0.050	-	0.020	-	-	-	-	0.030	-	-	0.020
Ra226 (Bq/L)	1.000	1.300	1.500	1.400	1.100	1.300	1.300	1.300	1.400	1.100	2.200	1.400	0.690	1.100	1.600	2.300
U (µg/L)	453.0	431.0	395.0	389.0	226.0	242.0	258.0	267.0	338.0	361.0	494.0	471.0	384.0	175.0	226.0	160.0
C-(org) (mg/L)	-	-	-	-	-	-	-	-	-	-	-	-	12.000	-	-	9.500

Station: TL-9

	2009-Jan	2009-Feb	2009-Apr	2009-Jul	2009-Aug	2009-Sep	2009-Oct	2010-Jan	2010-Feb	2010-Mar	2010-May
Cond-L (µS/cm)	414	442	343	316	304	310	336	488	533	477	359
pH-L (pH Unit)	8.24	8.04	8.00	8.14	8.11	8.26	7.98	7.88	7.98	8.12	8.18
TSS (mg/L)	1.000	3.000	1.000	1.500	1.000	1.000	<1.000	<1.000	<1.000	2.000	<1.000
Alk-T (mg/L)	165.0	173.0	133.0	127.5	126.0	126.0	134.0	197.0	208.0	195.0	146.0
Ca (mg/L)	26.0	30.0	24.0	21.0	18.0	19.0	22.0	33.0	34.0	35.0	28.0
Cl (mg/L)	9.00	7.00	6.00	6.00	6.00	6.00	7.00	10.00	12.00	8.00	7.00
CO3 (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Hardness (mg/L)	96	106	84	76	69	71	80	128	142	121	95
HCO3 (mg/L)	201.0	211.0	162.0	155.5	154.0	154.0	163.0	240.0	254.0	238.0	178.0
K (mg/L)	1.4	2.1	1.5	1.3	1.2	1.8	1.3	2.1	3.8	1.9	1.5
Mg (mg/L)	7.7	7.5	5.9	5.6	5.9	5.8	6.1	11.0	14.0	8.1	6.2
Na (mg/L)	50.0	55.0	44.0	38.5	41.0	40.0	40.0	60.0	65.0	63.0	41.0
OH (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
SO4 (mg/L)	44.0	50.0	39.0	31.5	33.0	32.0	33.0	49.0	56.0	46.0	33.0
Sum of Ions (mg/L)	339	363	282	260	259	259	272	405	439	400	295
TDS (mg/L)	254.00	256.00	220.00	209.00	195.00	205.00	217.00	308.00	369.00	312.00	243.00
As (µg/L)	1.9	-	-	1.8	-	1.5	-	1.0	0.7	1.6	1.2
Ba (mg/L)	1.240	0.940	0.450	0.800	0.730	0.750	0.880	0.280	0.180	0.940	0.850
Cu (mg/L)	<0.001	-	-	0.001	-	0.001	-	0.001	0.001	0.001	0.001
Fe (mg/L)	0.022	-	-	0.071	-	0.049	-	0.014	0.024	0.031	0.011
Mo (mg/L)	-	-	-		-	-	-	0.011	0.008	0.014	0.010
Ni (mg/L)	<0.00100	-	-	0.00040	-	0.00030	-	0.00050	0.00050	0.00060	0.00030
Pb (mg/L)	<0.0020	-	-	0.0009	-	0.0006	-	0.0002	0.0001	0.0003	0.0004
Se (mg/L)	-	0.0044	0.0046	0.0023	0.0023	0.0024	0.0029	0.0063	0.0056	0.0032	0.0040
Zn (mg/L)	<0.005	-	-	0.001		<0.001		0.001	0.001	0.001	0.001
NO3 (mg/L)	-	-	-	-	-	-	-	<0.04	<0.04	0.13	0.31
P-(TP) (mg/L)	-	-	-	-	-	-	-	-	-	0.03	-
Pb210 (Bq/L)	0.10	-	-	0.10	-	0.02	-	-	-	0.06	-
Po210 (Bq/L)	0.020	-	-	0.060	-	0.040	-	-	-	0.020	-
Ra226 (Bq/L)	2.900	2.400	1.200	2.100	1.900	2.000	2.000	0.480	0.480	2.300	0.660
U (µg/L)	397.0	460.0	342.0	220.0	206.0	217.0	309.0	557.0	603.0	469.0	306.0
C-(org) (mg/L)	-	-	-	-	-	-	-	-	-	14.000	-

APPENDIX B

ANNUAL SUMMARY STATISTICS

Routine Summary Statistics Report for Beaverlodge Environment

From January 1, 2009 To June 30, 2010

Station: AC-14 - Ace Creek discharge to Beaverlodge Lake

	January 1, 2009 To June 30, 2010 Statistics		
	Average	Count	Std Dev
Physical Properties			
Cond-L (µS/cm)	**114**	19	7
pH-L (pH Unit)	**7.77**	19	0.08
TSS (mg/L)	**1.263**	19	0.733
Major Ions			
Alk-T (mg/L)	**50.9**	19	3.7
Ca (mg/L)	**16.4**	19	1.2
Cl (mg/L)	**1.17**	19	0.21
CO3 (mg/L)	**1.0**	19	0.0
Hardness (mg/L)	**54**	19	4
HCO3 (mg/L)	**62.1**	19	4.4
K (mg/L)	**0.7**	19	0.1
Mg (mg/L)	**3.2**	19	0.3
Na (mg/L)	**1.8**	19	0.1
OH (mg/L)	**1.0**	19	0.0
SO4 (mg/L)	**7.4**	19	0.5
Sum of Ions (mg/L)	**93**	19	6
TDS (mg/L)	**78.53**	19	9.79
Metals			
As (µg/L)	**0.2**	12	0.0
Ba (mg/L)	**0.023**	9	0.002
Cu (mg/L)	**0.001**	12	0.000
Fe (mg/L)	**0.062**	12	0.021
Mo (mg/L)	**0.001**	7	0.000
Ni (mg/L)	**0.00024**	12	0.00025
Pb (mg/L)	**0.0004**	12	0.0005
Se (mg/L)	**0.0001**	16	0.0001
Zn (mg/L)	**0.002**	12	0.002
Nutrients			
NO3 (mg/L)	**0.21**	7	0.25
P-(TP) (mg/L)	**0.01**	2	0.00
Radionuclides			
Pb210 (Bq/L)	**0.02**	7	0.00
Po210 (Bq/L)	**0.010**	7	0.005
Ra226 (Bq/L)	**0.033**	19	0.012
U (µg/L)	**22.5**	19	4.8
Organics			
C-(org) (mg/L)	**7.800**	2	0.283

Routine Summary Statistics Report for Beaverlodge Environment

From January 1, 2009 To June 30, 2010

Station: AC-8 - Ace Lake discharge at weir

	January 1, 2009 To June 30, 2010 Statistics		
	Average	Count	Std Dev
Physical Properties			
Cond-L (µS/cm)	**110**	7	10
pH-L (pH Unit)	**7.70**	7	0.14
TSS (mg/L)	**1.286**	7	0.756
Major Ions			
Alk-T (mg/L)	**49.9**	7	3.3
Ca (mg/L)	**15.7**	7	1.4
Cl (mg/L)	**0.96**	7	0.11
CO3 (mg/L)	**1.0**	7	0.0
Hardness (mg/L)	**52**	7	5
HCO3 (mg/L)	**60.7**	7	4.0
K (mg/L)	**0.7**	7	0.1
Mg (mg/L)	**3.1**	7	0.3
Na (mg/L)	**1.5**	7	0.2
OH (mg/L)	**1.0**	7	0.0
SO4 (mg/L)	**6.5**	7	0.7
Sum of Ions (mg/L)	**89**	7	6
TDS (mg/L)	**74.86**	7	7.17
Metals			
As (µg/L)	**0.1**	4	0.1
Ba (mg/L)	**0.022**	4	0.002
Cu (mg/L)	**0.001**	4	0.000
Fe (mg/L)	**0.032**	4	0.020
Mo (mg/L)	**0.001**	3	0.000
Ni (mg/L)	**0.00015**	4	0.00006
Pb (mg/L)	**0.0001**	4	0.0000
Se (mg/L)	**0.0001**	5	0.0000
Zn (mg/L)	**0.001**	4	0.001
Nutrients			
NO3 (mg/L)	**0.10**	3	0.10
P-(TP) (mg/L)	**0.01**	1	
Radionuclides			
Pb210 (Bq/L)	**0.02**	2	0.00
Po210 (Bq/L)	**0.005**	2	0.000
Ra226 (Bq/L)	**0.014**	7	0.006
U (µg/L)	**14.1**	7	2.4
Organics			
C-(org) (mg/L)	**8.100**	1	

Routine Summary Statistics Report for Beaverlodge Environment

From January 1, 2009 To June 30, 2010

Station: AN-3 - Fulton Lake discharge

	January 1, 2009 To June 30, 2010 Statistics		
	Average	Count	Std Dev
Physical Properties			
Cond-L (µS/cm)	**136**	1	
pH-L (pH Unit)	**7.88**	1	
TSS (mg/L)	**1.000**	1	
Major Ions			
Alk-T (mg/L)	**69.0**	1	
Ca (mg/L)	**20.0**	1	
Cl (mg/L)	**0.60**	1	
CO3 (mg/L)	**1.0**	1	
Hardness (mg/L)	**68**	1	
HCO3 (mg/L)	**84.0**	1	
K (mg/L)	**0.8**	1	
Mg (mg/L)	**4.5**	1	
Na (mg/L)	**1.8**	1	
OH (mg/L)	**1.0**	1	
SO4 (mg/L)	**4.3**	1	
Sum of Ions (mg/L)	**116**	1	
TDS (mg/L)	**89.00**	1	
Metals			
As (µg/L)	**0.1**	1	
Cu (mg/L)	**0.001**	1	
Fe (mg/L)	**0.013**	1	
Ni (mg/L)	**0.00010**	1	
Pb (mg/L)	**0.0001**	1	
Se (mg/L)	**0.0001**	1	
Zn (mg/L)	**0.001**	1	
Radionuclides			
Pb210 (Bq/L)	**0.02**	1	
Po210 (Bq/L)	**0.006**	1	
Ra226 (Bq/L)	**0.005**	1	
U (µg/L)	**1.6**	1	

Routine Summary Statistics Report for Beaverlodge Environment

From January 1, 2009 To June 30, 2010

Station: AN-4 - Martin Lake - along north shore , mid lake

	January 1, 2009 To June 30, 2010 Statistics		
	Average	Count	Std Dev
Physical Properties			
Cond-L (µS/cm)	**162**	2	11
pH-L (pH Unit)	**7.90**	2	0.04
TSS (mg/L)	**1.500**	2	0.707
Major Ions			
Alk-T (mg/L)	**64.0**	2	0.0
Ca (mg/L)	**19.5**	2	2.1
Cl (mg/L)	**5.00**	2	2.69
CO3 (mg/L)	**1.0**	2	0.0
Hardness (mg/L)	**65**	2	6
HCO3 (mg/L)	**78.0**	2	0.0
K (mg/L)	**1.1**	2	0.1
Mg (mg/L)	**4.0**	2	0.1
Na (mg/L)	**7.3**	2	3.9
OH (mg/L)	**1.0**	2	0.0
SO4 (mg/L)	**11.9**	2	5.7
Sum of Ions (mg/L)	**127**	2	10
TDS (mg/L)	**109.00**	2	5.66
Metals			
As (µg/L)	**0.2**	1	
Ba (mg/L)	**0.046**	1	
Cu (mg/L)	**0.001**	1	
Fe (mg/L)	**0.028**	1	
Mo (mg/L)	**0.001**	1	
Ni (mg/L)	**0.00020**	1	
Pb (mg/L)	**0.0003**	1	
Se (mg/L)	**0.0004**	1	
Zn (mg/L)	**0.004**	1	
Nutrients			
NO3 (mg/L)	**0.09**	1	
P-(TP) (mg/L)	**0.03**	1	
Radionuclides			
Pb210 (Bq/L)	**0.02**	1	
Po210 (Bq/L)	**0.005**	1	
Ra226 (Bq/L)	**0.009**	2	0.001
U (µg/L)	**39.0**	2	33.9
Organics			
C-(org) (mg/L)	**11.000**	1	

Routine Summary Statistics Report for Beaverlodge Environment

From January 1, 2009 To June 30, 2010

Station: AN-5 - Hab Site - upstream of confluence of hab and pistol creeks

	January 1, 2009 To June 30, 2010 Statistics		
	Average	Count	Std Dev
Physical Properties			
Cond-L (µS/cm)	**248**	8	96
pH-L (pH Unit)	**7.62**	8	0.13
TSS (mg/L)	**2.500**	8	2.000
Major Ions			
Alk-T (mg/L)	**114.9**	8	50.6
Ca (mg/L)	**34.3**	8	13.5
Cl (mg/L)	**1.21**	8	0.86
CO3 (mg/L)	**1.0**	8	0.0
Hardness (mg/L)	**120**	8	46
HCO3 (mg/L)	**140.4**	8	61.9
K (mg/L)	**1.6**	8	0.6
Mg (mg/L)	**8.3**	8	3.0
Na (mg/L)	**4.4**	8	2.2
OH (mg/L)	**1.0**	8	0.0
SO4 (mg/L)	**15.7**	8	3.8
Sum of Ions (mg/L)	**206**	8	83
TDS (mg/L)	**168.38**	8	57.40
Metals			
As (µg/L)	**0.5**	5	0.2
Ba (mg/L)	**0.162**	5	0.068
Cu (mg/L)	**0.001**	5	0.001
Fe (mg/L)	**0.600**	5	0.637
Mo (mg/L)	**0.002**	3	0.002
Ni (mg/L)	**0.00058**	5	0.00008
Pb (mg/L)	**0.0003**	5	0.0005
Se (mg/L)	**0.0002**	7	0.0001
Zn (mg/L)	**0.002**	5	0.001
Nutrients			
NO3 (mg/L)	**0.04**	3	0.00
P-(TP) (mg/L)	**0.04**	1	
Radionuclides			
Pb210 (Bq/L)	**0.05**	3	0.04
Po210 (Bq/L)	**0.033**	3	0.025
Ra226 (Bq/L)	**1.054**	7	0.641
U (µg/L)	**140.7**	7	67.8
Organics			
C-(org) (mg/L)	**13.000**	1	

Routine Summary Statistics Report for Beaverlodge Environment

From January 1, 2009 To June 30, 2010

Station: BL-3 - Beaverlodge Lake - 100m out from TL-9

	January 1, 2009 To June 30, 2010 Statistics		
	Average	Count	Std Dev
Physical Properties			
Cond-L (µS/cm)	**253**	6	16
pH-L (pH Unit)	**7.96**	6	0.08
TSS (mg/L)	**1.000**	6	0.000
Major Ions			
Alk-T (mg/L)	**73.2**	6	5.6
Ca (mg/L)	**22.3**	6	2.0
Cl (mg/L)	**14.00**	6	1.26
CO3 (mg/L)	**1.0**	6	0.0
Hardness (mg/L)	**78**	6	7
HCO3 (mg/L)	**89.3**	6	6.9
K (mg/L)	**1.2**	6	0.3
Mg (mg/L)	**5.5**	6	0.4
Na (mg/L)	**20.2**	6	1.5
OH (mg/L)	**1.0**	6	0.0
SO4 (mg/L)	**33.8**	6	2.4
Sum of Ions (mg/L)	**186**	6	14
TDS (mg/L)	**152.00**	6	7.10
Metals			
As (µg/L)	**0.4**	6	0.3
Ba (mg/L)	**0.042**	2	0.013
Cu (mg/L)	**0.001**	6	0.000
Fe (mg/L)	**0.009**	6	0.004
Mo (mg/L)	**0.004**	2	0.000
Ni (mg/L)	**0.00198**	6	0.00072
Pb (mg/L)	**0.0005**	6	0.0008
Se (mg/L)	**0.0030**	6	0.0002
Zn (mg/L)	**0.004**	6	0.001
Nutrients			
NO3 (mg/L)	**0.04**	2	0.00
P-(TP) (mg/L)	**0.01**	2	0.01
Radionuclides			
Pb210 (Bq/L)	**0.02**	6	0.00
Po210 (Bq/L)	**0.005**	6	0.000
Ra226 (Bq/L)	**0.052**	6	0.021
U (µg/L)	**149.0**	6	12.9
Organics			
C-(org) (mg/L)	**3.600**	2	1.273

Routine Summary Statistics Report for Beaverlodge Environment

From January 1, 2009 To June 30, 2010

Station: BL-4 - Beaverlodge Lake - middle - composite of top, middle, bottom

	January 1, 2009 To June 30, 2010 Statistics		
	Average	Count	Std Dev
Physical Properties			
Cond-L (µS/cm)	**245**	6	9
pH-L (pH Unit)	**7.99**	6	0.11
TSS (mg/L)	**1.000**	6	0.000
Major Ions			
Alk-T (mg/L)	**70.3**	6	2.8
Ca (mg/L)	**21.3**	6	0.8
Cl (mg/L)	**13.50**	6	0.55
CO3 (mg/L)	**1.0**	6	0.0
Hardness (mg/L)	**75**	6	3
HCO3 (mg/L)	**85.8**	6	3.3
K (mg/L)	**1.2**	6	0.1
Mg (mg/L)	**5.3**	6	0.2
Na (mg/L)	**19.5**	6	1.0
OH (mg/L)	**1.0**	6	0.0
SO4 (mg/L)	**32.8**	6	1.0
Sum of Ions (mg/L)	**180**	6	7
TDS (mg/L)	**145.33**	6	7.92
Metals			
As (µg/L)	**0.3**	6	0.1
Ba (mg/L)	**0.035**	2	0.004
Cu (mg/L)	**0.002**	6	0.001
Fe (mg/L)	**0.012**	6	0.010
Mo (mg/L)	**0.003**	2	0.000
Ni (mg/L)	**0.00202**	6	0.00125
Pb (mg/L)	**0.0005**	6	0.0008
Se (mg/L)	**0.0029**	6	0.0003
Zn (mg/L)	**0.006**	6	0.005
Nutrients			
NO3 (mg/L)	**0.07**	2	0.04
P-(TP) (mg/L)	**0.01**	2	0.01
Radionuclides			
Pb210 (Bq/L)	**0.02**	6	0.01
Po210 (Bq/L)	**0.005**	6	0.000
Ra226 (Bq/L)	**0.030**	6	0.009
U (µg/L)	**143.2**	6	8.4
Organics			
C-(org) (mg/L)	**3.300**	2	0.141

Routine Summary Statistics Report for Beaverlodge Environment

From January 1, 2009 To June 30, 2010

Station: DB-6 - Dubyna Lake discharge at culvert

	January 1, 2009 To June 30, 2010 Statistics		
	Average	Count	Std Dev
Physical Properties			
Cond-L (µS/cm)	**220**	8	26
pH-L (pH Unit)	**7.83**	8	0.09
TSS (mg/L)	**1.000**	8	0.000
Major Ions			
Alk-T (mg/L)	**85.6**	8	9.7
Ca (mg/L)	**35.1**	8	3.9
Cl (mg/L)	**0.65**	8	0.13
CO3 (mg/L)	**1.0**	8	0.0
Hardness (mg/L)	**110**	8	13
HCO3 (mg/L)	**104.5**	8	11.8
K (mg/L)	**0.9**	8	0.4
Mg (mg/L)	**5.4**	8	0.8
Na (mg/L)	**2.0**	8	0.3
OH (mg/L)	**1.0**	8	0.0
SO4 (mg/L)	**26.0**	8	4.1
Sum of Ions (mg/L)	**175**	8	20
TDS (mg/L)	**152.25**	8	20.42
Metals			
As (µg/L)	**0.1**	5	0.1
Ba (mg/L)	**0.046**	5	0.006
Cu (mg/L)	**0.001**	5	0.000
Fe (mg/L)	**0.017**	5	0.011
Mo (mg/L)	**0.002**	2	0.000
Ni (mg/L)	**0.00022**	5	0.00004
Pb (mg/L)	**0.0001**	5	0.0000
Se (mg/L)	**0.0002**	6	0.0001
Zn (mg/L)	**0.001**	5	0.000
Nutrients			
NO3 (mg/L)	**0.31**	2	0.31
P-(TP) (mg/L)		0	
Radionuclides			
Pb210 (Bq/L)	**0.02**	3	0.00
Po210 (Bq/L)	**0.013**	3	0.006
Ra226 (Bq/L)	**0.034**	8	0.005
U (µg/L)	**220.3**	8	78.1
Organics			
C-(org) (mg/L)		0	

Routine Summary Statistics Report for Beaverlodge Environment

From January 1, 2009 To June 30, 2010

Station: TL-3 - Fookes Lake discharge

	January 1, 2009 To June 30, 2010 Statistics		
	Average	Count	Std Dev
Physical Properties			
Cond-L (µS/cm)	**345**	17	38
pH-L (pH Unit)	**8.15**	17	0.11
TSS (mg/L)	**1.294**	17	0.588
Major Ions			
Alk-T (mg/L)	**133.3**	17	15.4
Ca (mg/L)	**26.4**	17	3.8
Cl (mg/L)	**4.01**	17	0.67
CO3 (mg/L)	**1.0**	17	0.0
Hardness (mg/L)	**87**	17	12
HCO3 (mg/L)	**162.8**	17	18.8
K (mg/L)	**1.3**	17	0.4
Mg (mg/L)	**5.1**	17	0.7
Na (mg/L)	**40.8**	17	4.7
OH (mg/L)	**1.0**	17	0.0
SO4 (mg/L)	**42.4**	17	5.7
Sum of Ions (mg/L)	**283**	17	33
TDS (mg/L)	**217.41**	17	26.16
Metals			
As (µg/L)	**1.0**	6	0.1
Ba (mg/L)	**0.036**	17	0.007
Cu (mg/L)	**0.001**	6	0.000
Fe (mg/L)	**0.006**	6	0.003
Mo (mg/L)	**0.016**	6	0.003
Ni (mg/L)	**0.00030**	6	0.00006
Pb (mg/L)	**0.0004**	6	0.0002
Se (mg/L)	**0.0040**	9	0.0006
Zn (mg/L)	**0.001**	6	0.001
Nutrients			
NO3 (mg/L)	**0.09**	6	0.06
P-(TP) (mg/L)	**0.03**	1	
Radionuclides			
Pb210 (Bq/L)	**0.07**	1	
Po210 (Bq/L)	**0.040**	1	
Ra226 (Bq/L)	**1.161**	17	0.151
U (µg/L)	**378.6**	17	58.2
Organics			
C-(org) (mg/L)	**9.500**	1	

Routine Summary Statistics Report for Beaverlodge Environment

From January 1, 2009 To June 30, 2010

Station: TL-4 - marie lake outflow

	January 1, 2009 To June 30, 2010 Statistics		
	Average	Count	Std Dev
Physical Properties			
Cond-L (µS/cm)	**346**	16	40
pH-L (pH Unit)	**8.09**	16	0.12
TSS (mg/L)	**1.188**	16	0.544
Major Ions			
Alk-T (mg/L)	**138.4**	15	15.3
Ca (mg/L)	**22.7**	16	2.8
Cl (mg/L)	**4.10**	16	0.67
CO3 (mg/L)	**1.0**	15	0.0
Hardness (mg/L)	**79**	15	9
HCO3 (mg/L)	**167.4**	16	18.6
K (mg/L)	**1.5**	16	0.3
Mg (mg/L)	**5.2**	16	0.6
Na (mg/L)	**44.9**	16	5.2
OH (mg/L)	**1.0**	15	0.0
SO4 (mg/L)	**39.4**	16	5.4
Sum of Ions (mg/L)	**287**	15	32
TDS (mg/L)	**227.31**	16	40.97
Metals			
As (µg/L)	**1.6**	6	0.3
Ba (mg/L)	**0.068**	16	0.007
Cu (mg/L)	**0.001**	6	0.000
Fe (mg/L)	**0.029**	6	0.020
Mo (mg/L)	**0.014**	6	0.002
Ni (mg/L)	**0.00058**	6	0.00012
Pb (mg/L)	**0.0005**	6	0.0002
Se (mg/L)	**0.0027**	9	0.0005
Zn (mg/L)	**0.001**	6	0.000
Nutrients			
NO3 (mg/L)	**0.05**	6	0.02
P-(TP) (mg/L)	**0.03**	1	
Radionuclides			
Pb210 (Bq/L)	**0.20**	1	
Po210 (Bq/L)	**0.080**	1	
Ra226 (Bq/L)	**1.606**	16	0.195
U (µg/L)	**348.2**	16	53.9
Organics			
C-(org) (mg/L)	**10.000**	1	

Routine Summary Statistics Report for Beaverlodge Environment

From January 1, 2009 To June 30, 2010

Station: TL-6 - Minewater Lake discharge

	January 1, 2009 To June 30, 2010 Statistics		
	Average	Count	Std Dev
Physical Properties			
Cond-L (µS/cm)	**774**	3	116
pH-L (pH Unit)	**7.94**	3	0.01
TSS (mg/L)	**4.000**	3	4.359
Major Ions			
Alk-T (mg/L)	**295.0**	3	45.5
Ca (mg/L)	**46.7**	3	5.0
Cl (mg/L)	**55.33**	3	11.06
CO3 (mg/L)	**1.0**	3	0.0
Hardness (mg/L)	**163**	3	23
HCO3 (mg/L)	**359.7**	3	55.2
K (mg/L)	**2.9**	3	0.3
Mg (mg/L)	**11.4**	3	2.5
Na (mg/L)	**113.0**	3	19.0
OH (mg/L)	**1.0**	3	0.0
SO4 (mg/L)	**42.7**	3	3.8
Sum of Ions (mg/L)	**632**	3	95
TDS (mg/L)	**527.00**	3	78.02
Metals			
As (µg/L)	**1.2**	1	
Ba (mg/L)	**1.147**	3	0.180
Cu (mg/L)	**0.000**	1	
Fe (mg/L)	**0.710**	1	
Mo (mg/L)	**0.002**	1	
Ni (mg/L)	**0.00030**	1	
Pb (mg/L)	**0.0001**	1	
Se (mg/L)	**0.0023**	3	0.0001
Zn (mg/L)	**0.001**	1	
Nutrients			
NO3 (mg/L)	**0.04**	1	
Radionuclides			
Ra226 (Bq/L)	**5.567**	3	0.850
U (µg/L)	**222.7**	3	89.7

Routine Summary Statistics Report for Beaverlodge Environment

From January 1, 2009 To June 30, 2010

Station: TL-7 - Meadow Lake discharge at weir

	January 1, 2009 To June 30, 2010 Statistics		
	Average	Count	Std Dev
Physical Properties			
Cond-L (µS/cm)	**364**	17	70
pH-L (pH Unit)	**7.97**	17	0.18
TSS (mg/L)	**1.412**	17	0.795
Major Ions			
Alk-T (mg/L)	**145.8**	17	27.9
Ca (mg/L)	**24.9**	17	4.7
Cl (mg/L)	**5.73**	17	1.69
CO3 (mg/L)	**1.0**	17	0.0
Hardness (mg/L)	**85**	17	16
HCO3 (mg/L)	**177.9**	17	34.1
K (mg/L)	**1.5**	17	0.4
Mg (mg/L)	**5.7**	17	1.0
Na (mg/L)	**46.9**	17	11.4
OH (mg/L)	**1.0**	17	0.0
SO4 (mg/L)	**39.0**	17	9.8
Sum of Ions (mg/L)	**302**	17	61
TDS (mg/L)	**231.71**	17	43.88
Metals			
As (µg/L)	**1.5**	11	0.3
Ba (mg/L)	**0.232**	17	0.198
Cu (mg/L)	**0.001**	11	0.000
Fe (mg/L)	**0.157**	11	0.226
Mo (mg/L)	**0.012**	7	0.005
Ni (mg/L)	**0.00065**	11	0.00019
Pb (mg/L)	**0.0006**	11	0.0005
Se (mg/L)	**0.0026**	14	0.0006
Zn (mg/L)	**0.001**	11	0.002
Nutrients			
NO3 (mg/L)	**0.06**	7	0.04
P-(TP) (mg/L)	**0.02**	2	0.01
Radionuclides			
Pb210 (Bq/L)	**0.07**	6	0.05
Po210 (Bq/L)	**0.037**	6	0.015
Ra226 (Bq/L)	**1.370**	17	0.393
U (µg/L)	**324.2**	17	106.8
Organics			
C-(org) (mg/L)	**10.750**	2	1.768

Routine Summary Statistics Report for Beaverlodge Environment

From January 1, 2009 To June 30, 2010

Station: TL-9 - Greer Lake discharge at Beaverlodge Lake

	January 1, 2009 To June 30, 2010 Statistics		
	Average	Count	Std Dev
Physical Properties			
Cond-L (µS/cm)	**387**	12	81
pH-L (pH Unit)	**8.09**	12	0.12
TSS (mg/L)	**1.333**	12	0.651
Major Ions			
Alk-T (mg/L)	**154.8**	12	31.4
Ca (mg/L)	**25.9**	12	6.0
Cl (mg/L)	**7.50**	12	1.93
CO3 (mg/L)	**1.0**	12	0.0
Hardness (mg/L)	**95**	12	24
HCO3 (mg/L)	**188.8**	12	38.3
K (mg/L)	**1.8**	12	0.7
Mg (mg/L)	**7.4**	12	2.6
Na (mg/L)	**48.0**	12	10.2
OH (mg/L)	**1.0**	12	0.0
SO4 (mg/L)	**39.8**	12	8.8
Sum of Ions (mg/L)	**319**	12	67
TDS (mg/L)	**249.75**	12	53.93
Metals			
As (µg/L)	**1.4**	7	0.4
Ba (mg/L)	**0.737**	12	0.300
Cu (mg/L)	**0.001**	7	0.000
Fe (mg/L)	**0.032**	7	0.021
Mo (mg/L)	**0.011**	4	0.003
Ni (mg/L)	**0.00051**	7	0.00024
Pb (mg/L)	**0.0006**	7	0.0007
Se (mg/L)	**0.0038**	10	0.0014
Zn (mg/L)	**0.001**	7	0.002
Nutrients			
NO3 (mg/L)	**0.13**	4	0.13
P-(TP) (mg/L)	**0.03**	1	
Radionuclides			
Pb210 (Bq/L)	**0.07**	4	0.04
Po210 (Bq/L)	**0.035**	4	0.019
Ra226 (Bq/L)	**1.710**	12	0.806
U (µg/L)	**358.8**	12	138.3
Organics			
C-(org) (mg/L)	**14.000**	1	